

# KIC 012021811

## Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	$R_{\star}$ ( $R_{\odot}$ )	$T_{\star}$ (K)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
012021811-01	OBS	4905.01	0.739390	131.709570	123.4	1.600	9.4	9.8	0.62	4205	0.85	590.09
012021811-02	OBS	No	0.739407	132.062419	129.1	1.647	9.0	10.9	0.62	4205	0.87	590.07

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012021811-01	OBS	FP	0.00	1	0	1	0	LPP_DV—MOD_NONUNIQ_ALT—CENT_RESOLVED_OFFSET
012021811-02	OBS	FP	0.00	1	0	1	0	LPP_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_RESOLVED_OFFSET

**Notes:** OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

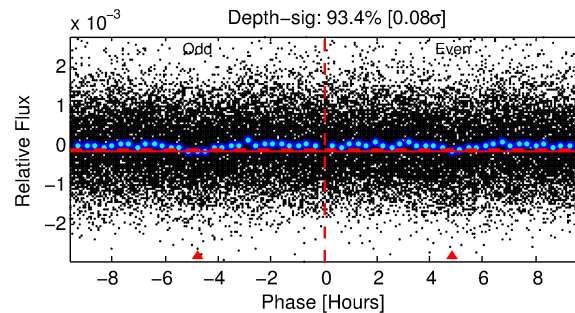
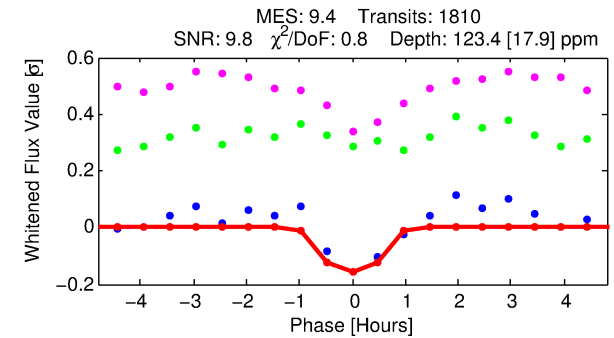
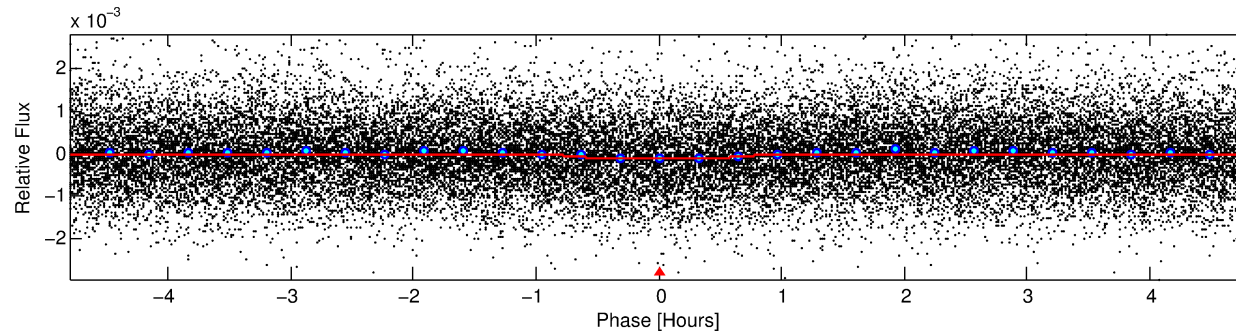
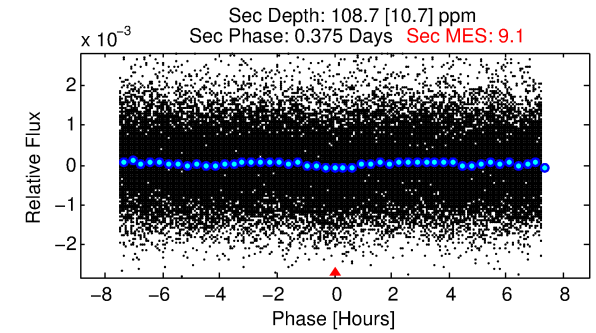
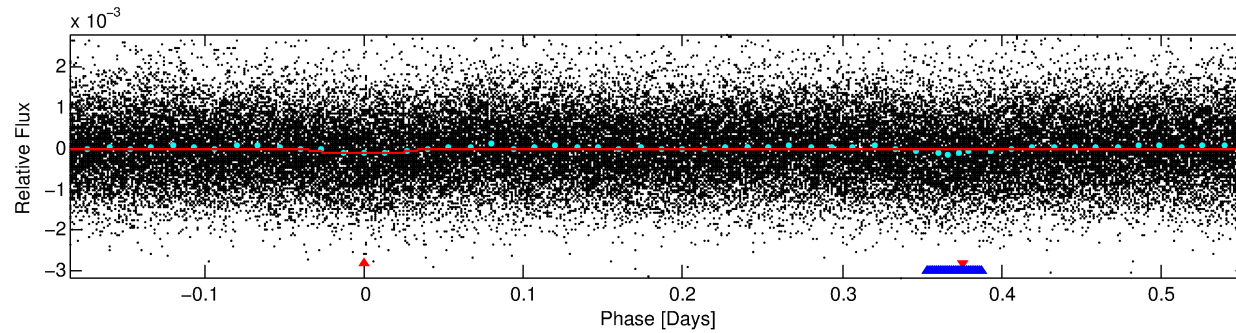
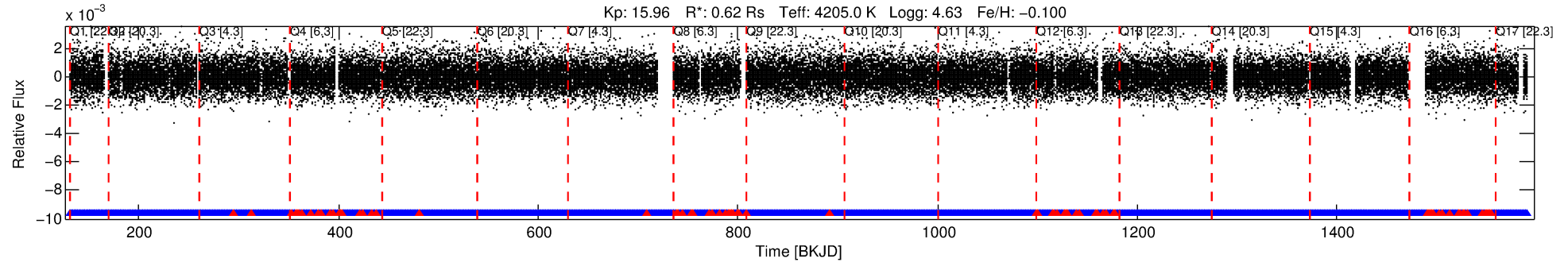
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 012021811-01

No Significant Match Found

# DV One-Page Summary

KIC: 12021811 Candidate: 1 of 2 Period: 0.739 d  
KOI: K04905.01 Corr: 0.872



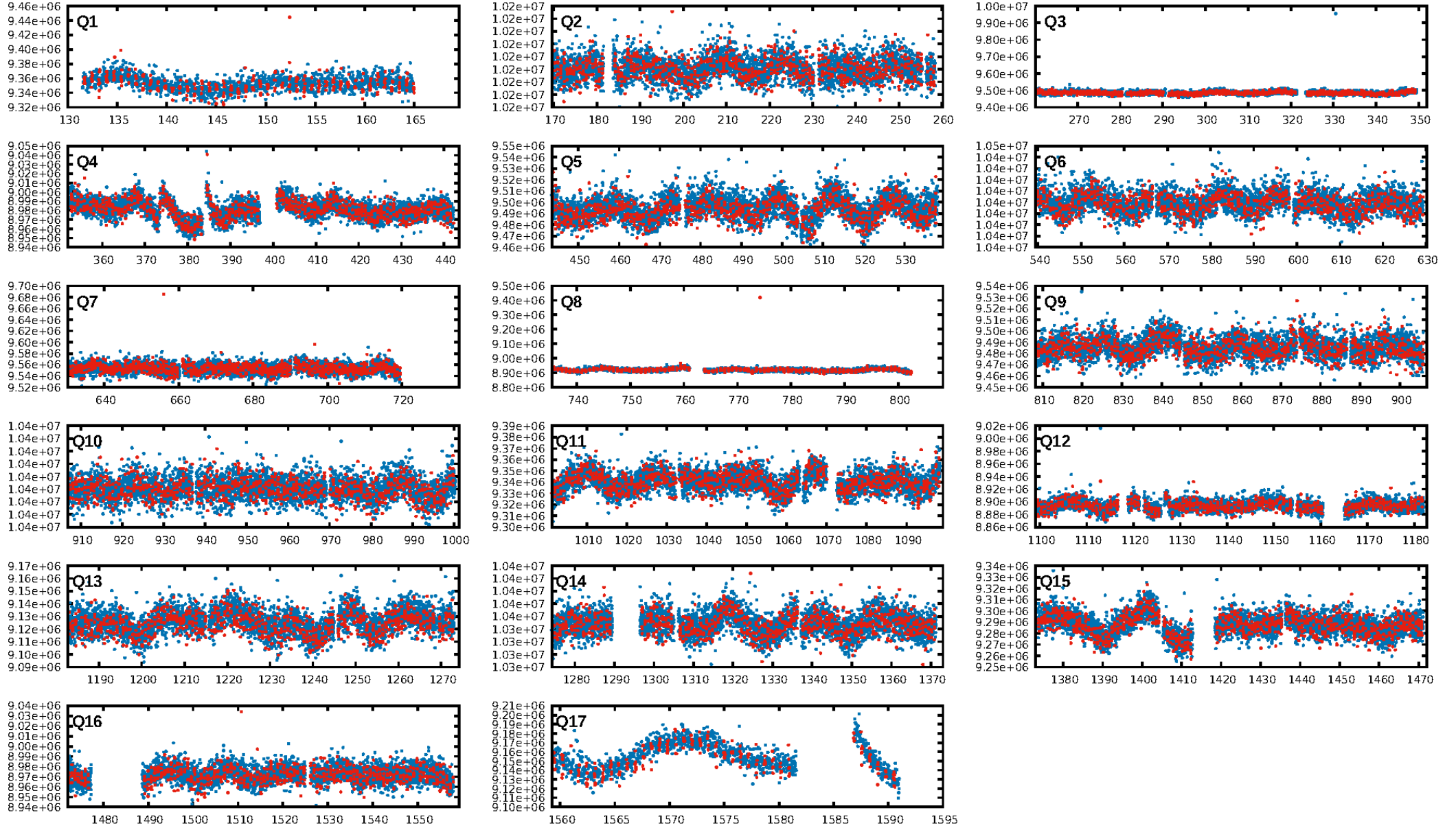
## DV Fit Results:

Period = 0.73939 [0.00001] d  
Epoch = 131.7096 [0.0024] BKJD  
Rp/R\* = 0.0125 [0.0149]  
a/R\* = 1.86 [6.28]  
b = 0.90 [0.98]  
Seff = 590.09 [93.48]  
Teff = 1257 [50] K  
Rp = 0.85 [1.02] Re  
a = 0.0136 [0.0010] AU  
Ag = 15.16 [35.99] [0.39σ]  
Teffp = 3834 [2277] K [1.13σ]

## DV Diagnostic Results:

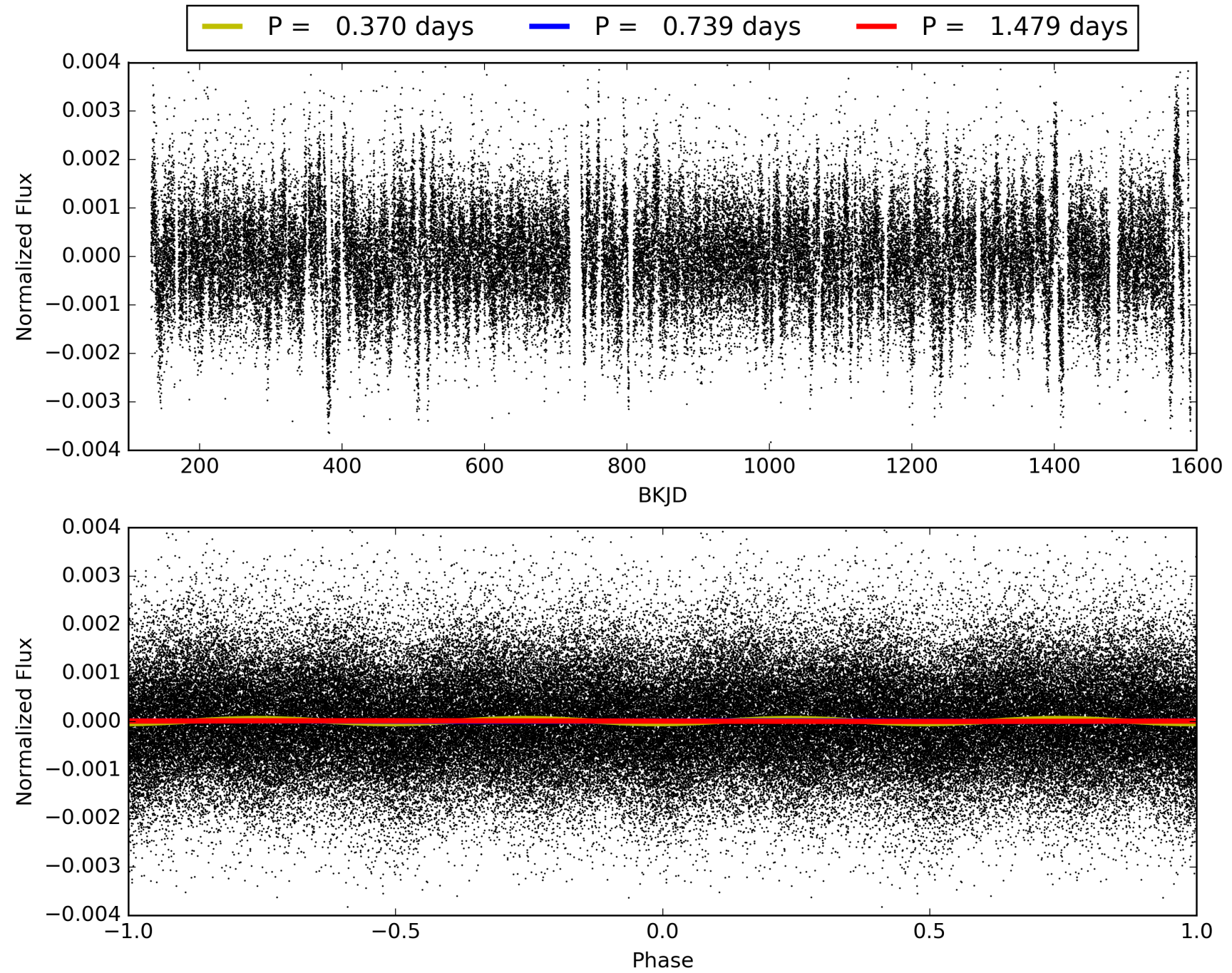
ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.02e-21  
RollingBand-fgt: 0.95 [1648/1728]  
GhostDiagnostic-chr: -0.4805  
Centroid-sig: 0.0%  
Centroid-so: 6.683 arcsec [4.71σ]  
OotOffset-rm: N/A  
KicOffset-rm: N/A  
OotOffset-st: 0/0/0 [0]  
KicOffset-st: 0/0/0 [0]  
DiffImageQuality-fgm: N/A  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 012021811-01, PDC Light Curves



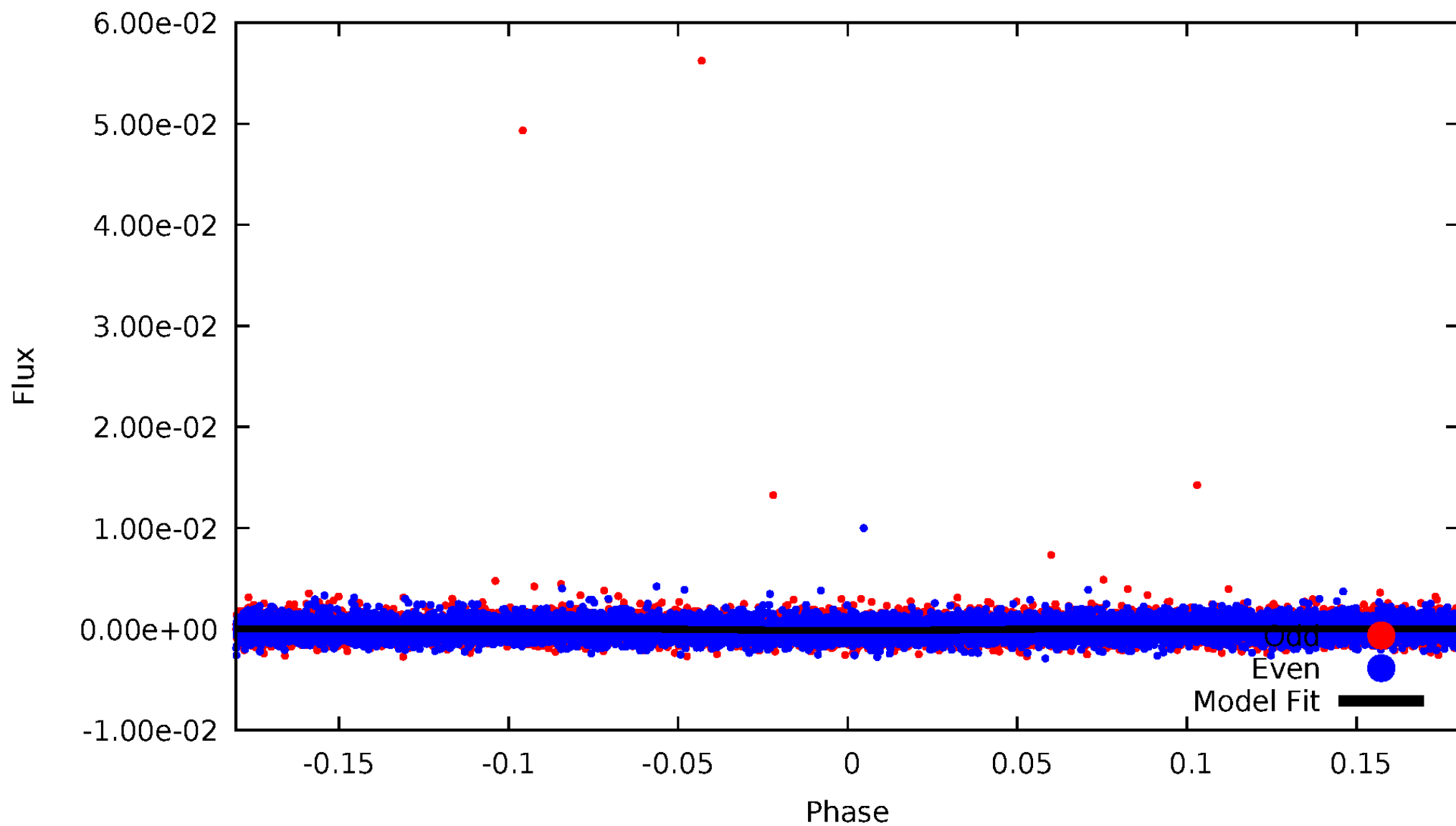


# TCE 012021811-01



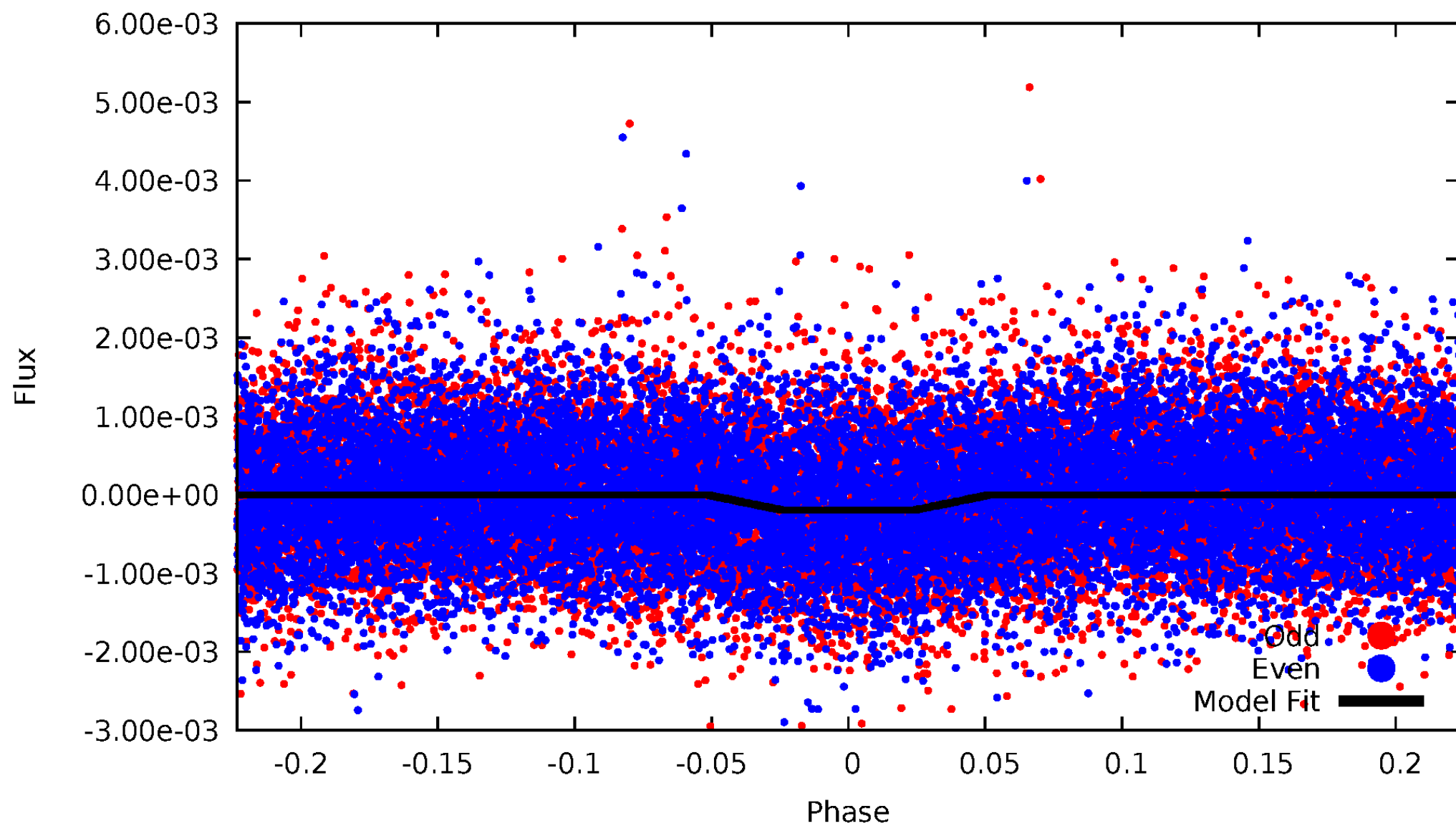
# DV Odd/Even

TCE 012021811-01



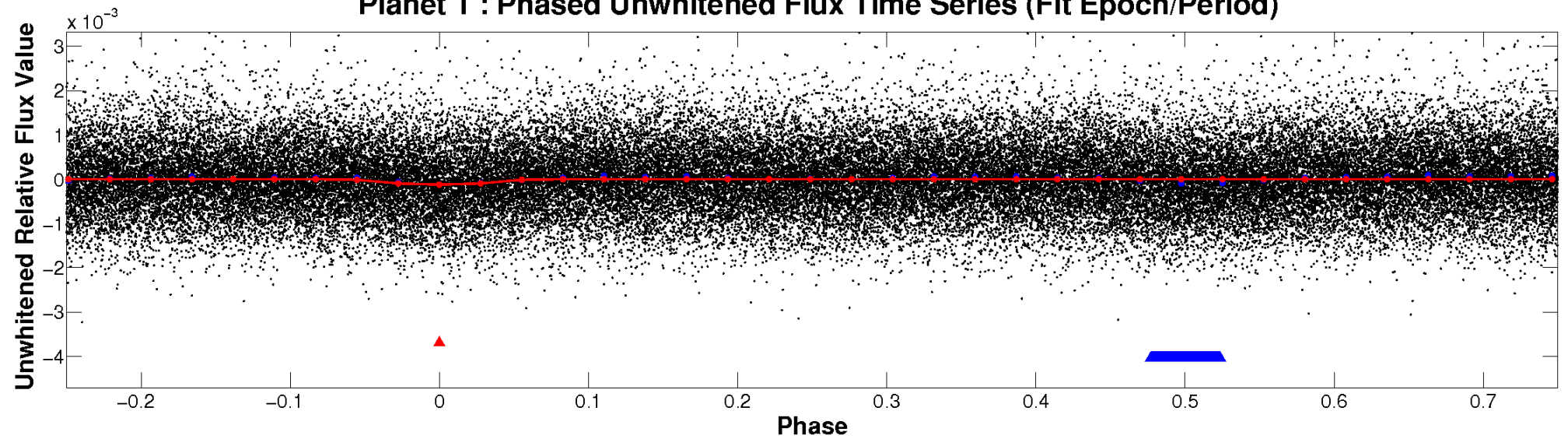
# ALT Odd/Even

TCE 012021811-01

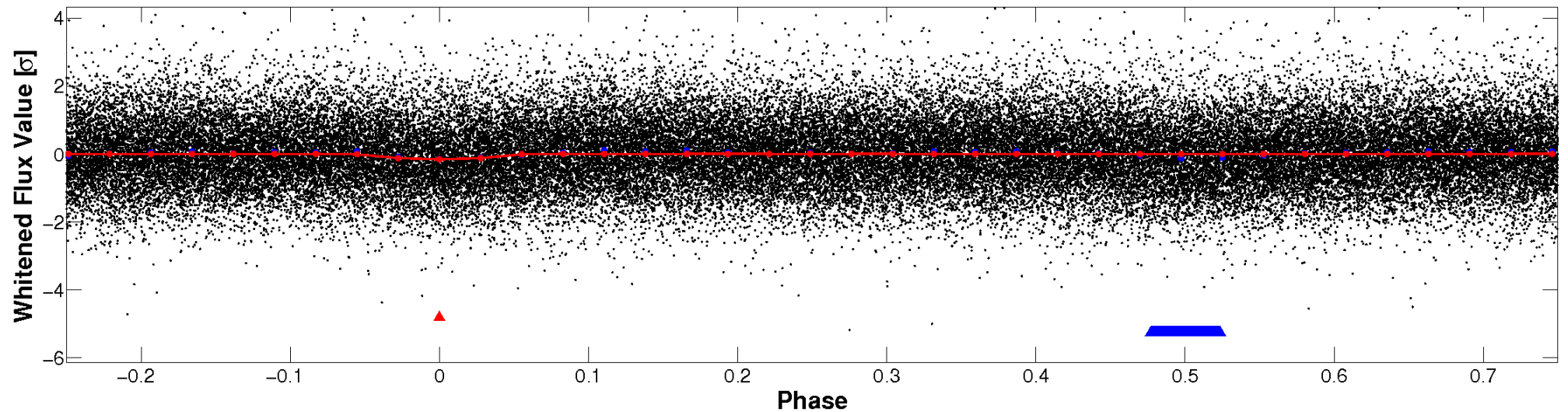


# Non-Whitened Vs. Whitened Light Curve

**Planet 1 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)**



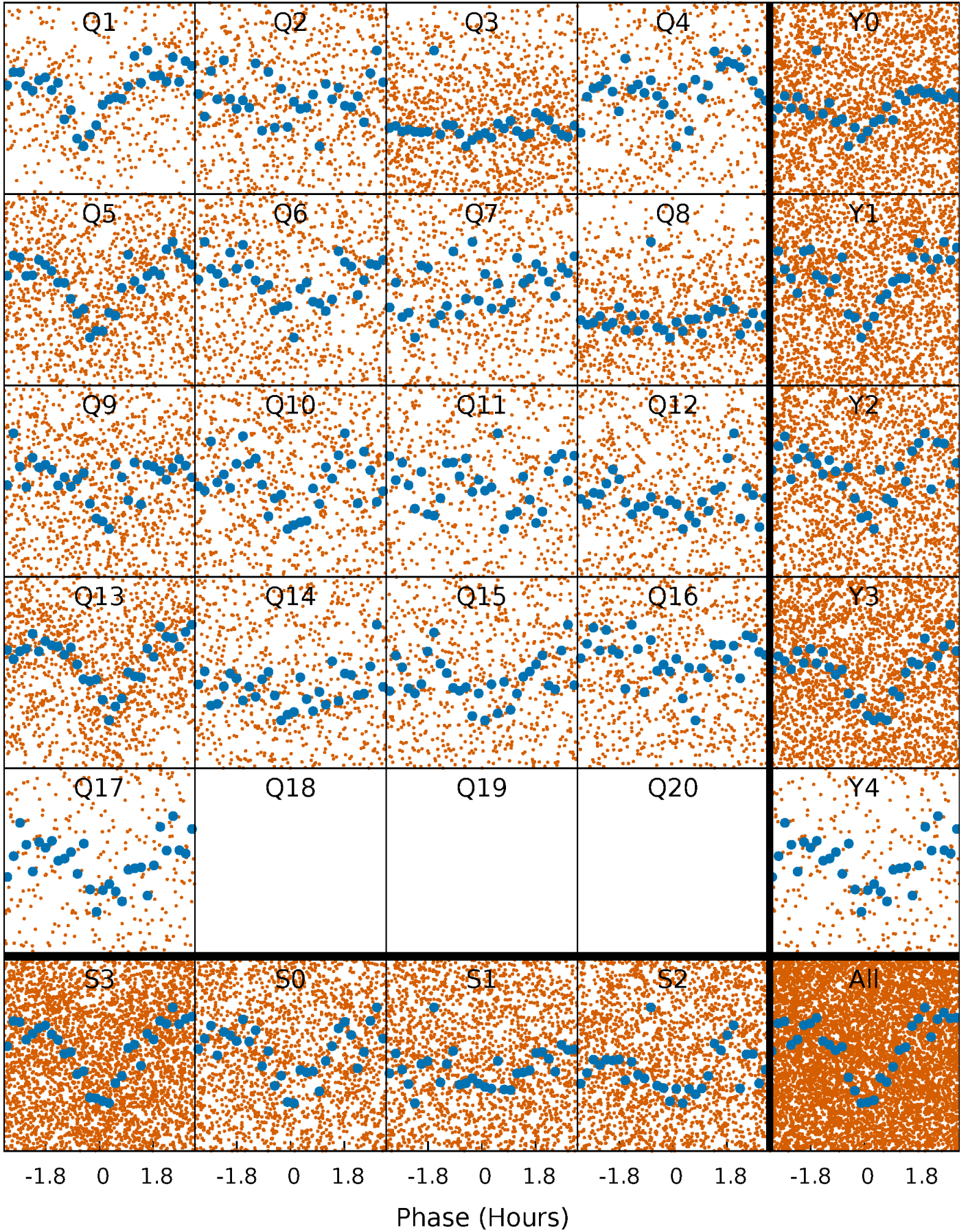
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

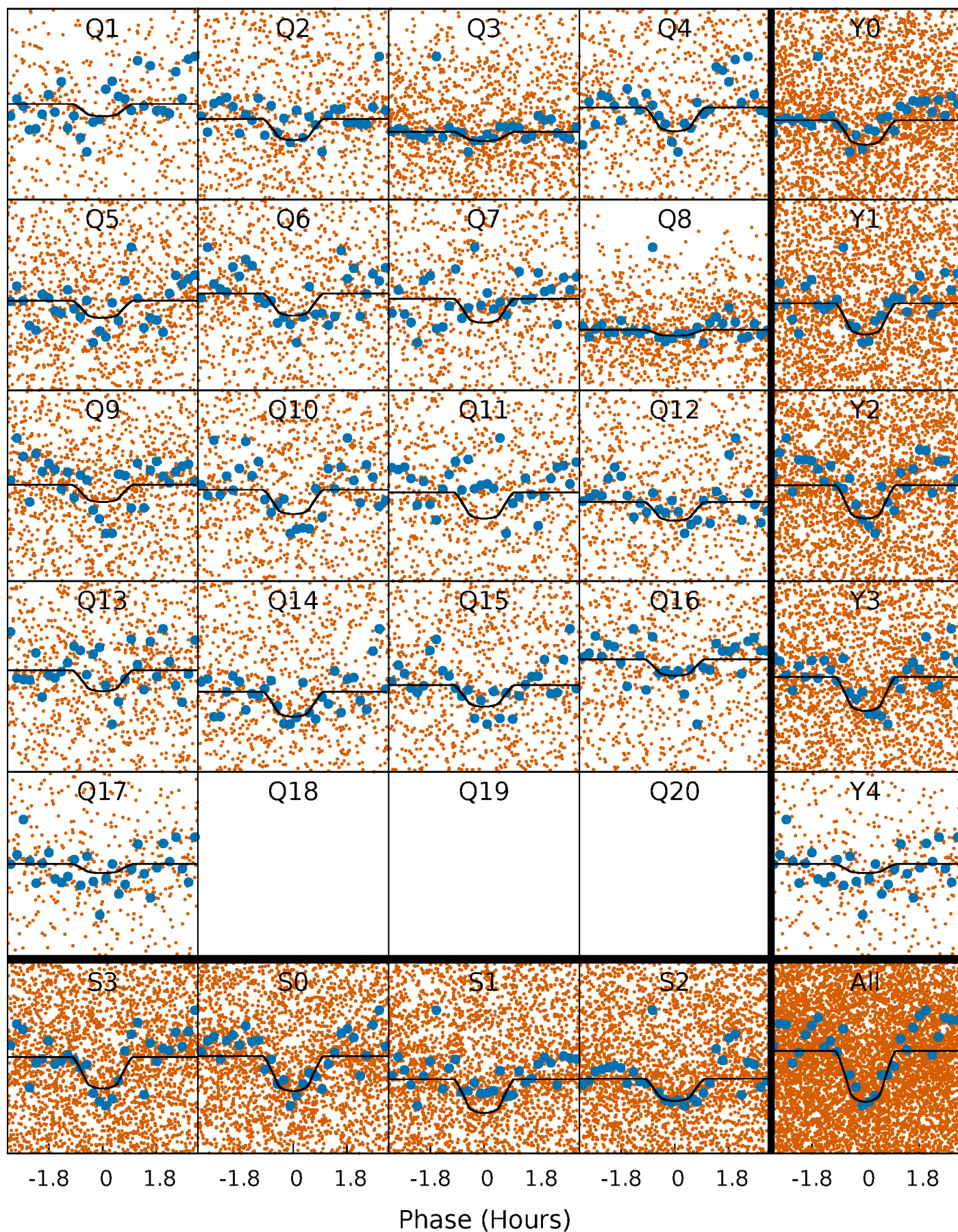
TCE 012021811-01   P= 0.739390 Days    $T_0=131.709570$  (BKJD)





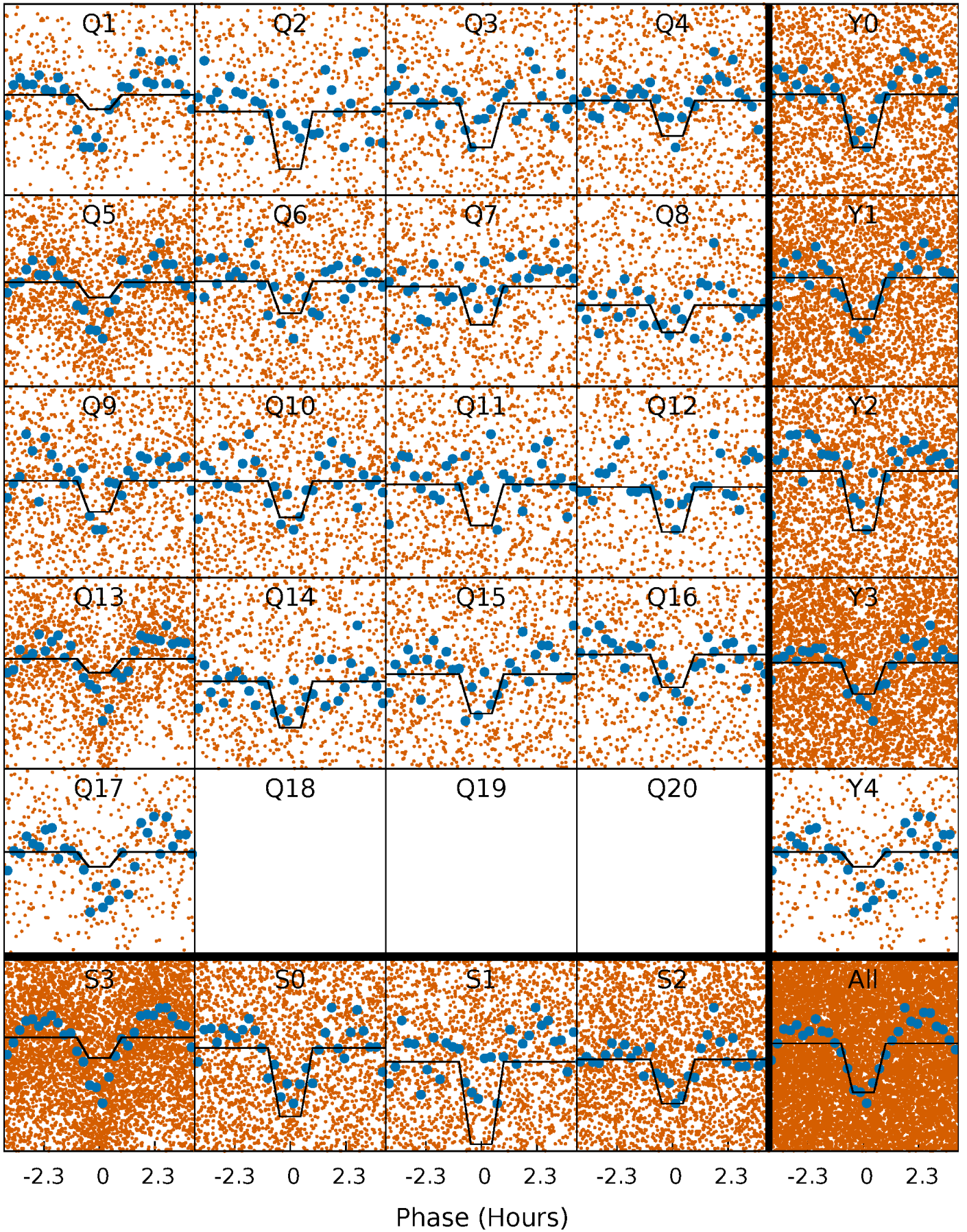
# DV Quarter-Phased Transit Curves

TCE 012021811-01   P= 0.739390 Days    $T_0=131.709570$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 012021811-01 P= 0.739398 Days  $T_0=131.705427$  (BKJD)

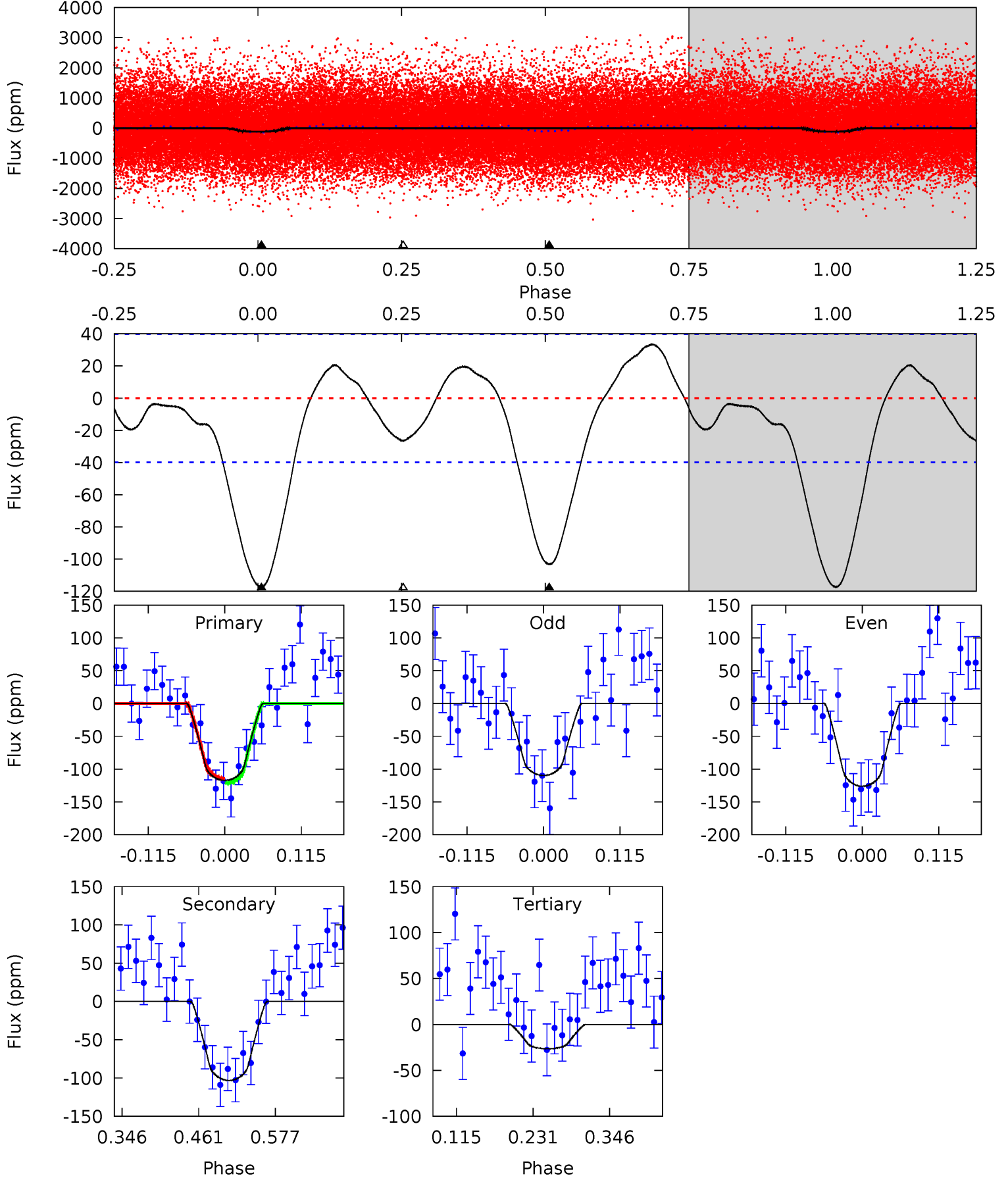




# DV Model-Shift Uniqueness Test

012021811-01, P = 0.739390 Days, E = 130.970180 Days

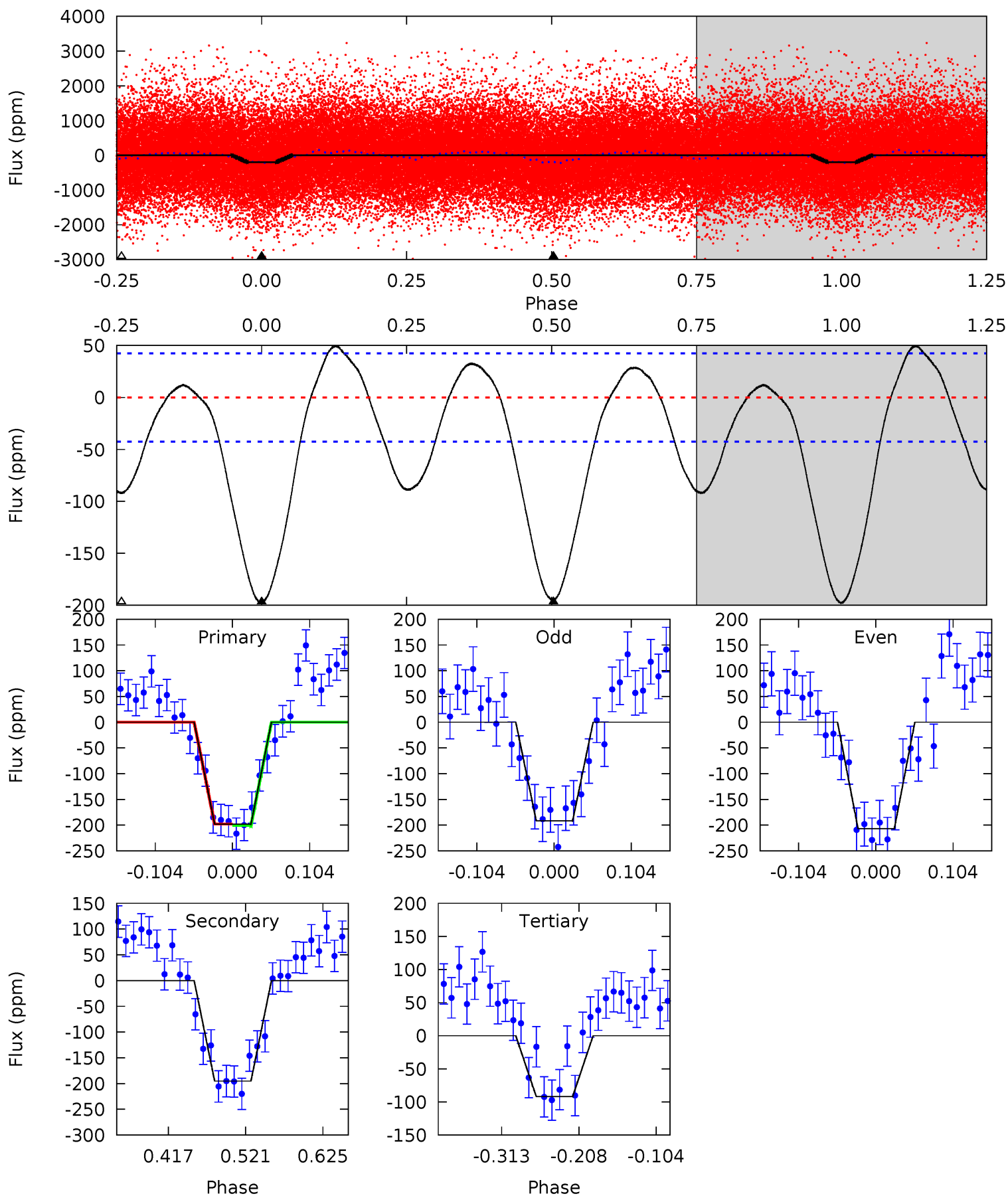
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.4	11.7	3.02	0	4.53	1.57	1.95	10.3	13.4	8.72	11.7	0.94	0.82	0.22	0.41



# Alt Model-Shift Uniqueness Test

012021811-01, P = 0.739398 Days, E = 130.966029 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
21.2	20.9	9.86	0	4.56	1.62	4.70	11.4	21.2	11.1	20.9	0.80	0.96	0.20	0.16





### Stellar Parameters For KIC 012021811

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4205^{+126}_{-126}$	$4.635^{+0.053}_{-0.021}$	$-0.100^{+0.300}_{-0.300}$	$0.624^{+0.040}_{-0.060}$	$0.614^{+0.061}_{-0.055}$	$3.552^{+0.830}_{-0.380}$
	+3%/-3%	+1%/-0%	+300%/-300%	+6%/-10%	+10%/-9%	+23%/-11%
Source	PHO1	KIC0	KIC0	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 012021811-01 / KOI 4905.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-103 \pm 9$	$1.06^{+0.85}_{-0.67}$	$1746^{+55}_{-56}$	$3600^{+1611}_{-628}$	$9.173^{+57.215}_{-6.233}$
Alt.	$-195 \pm 9$	$1.11^{+0.94}_{-0.67}$	$1743^{+58}_{-57}$	$3927^{+1839}_{-719}$	$16^{+86}_{-11}$

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

$T_{\text{obs}}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{\text{obs}}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{\text{obs}} \gg T_{\text{max}}$  AND  $A_{\text{obs}} \gg 1.0$

## DV Centroid Data

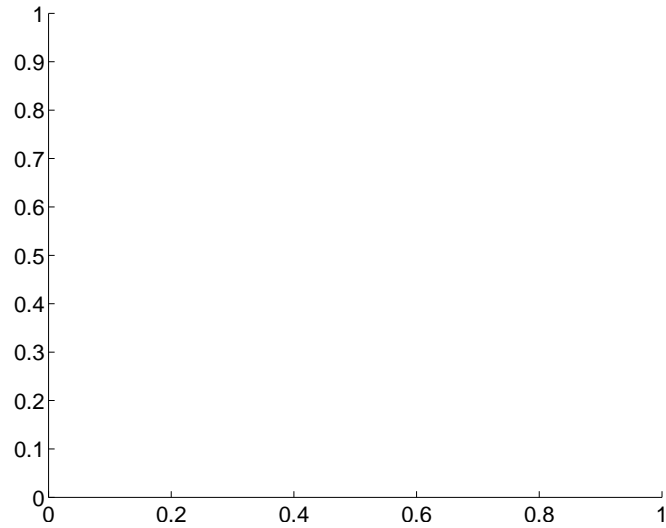
Supplemental centroid analysis for 012021811-01. Kepler magnitude: 15.96. Transit SNR 9.79

There are 0 quarters with good PRF difference image offsets

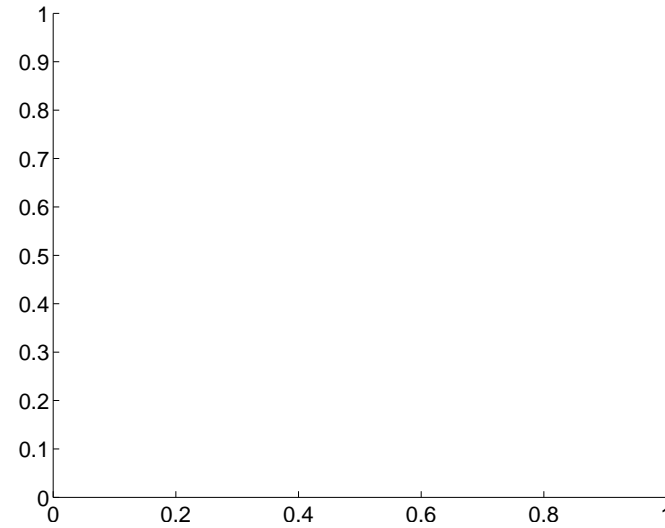
The direct PRF centroid is offset from the target star catalog position by about NaN arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	—	—	—	—
PRF-fit source offset from KIC position	—	—	—	—
photometric centroid source offset	$6.68 \pm 1.42$	4.71	$-2.02 \pm 1.38$	$-6.37 \pm 1.42$

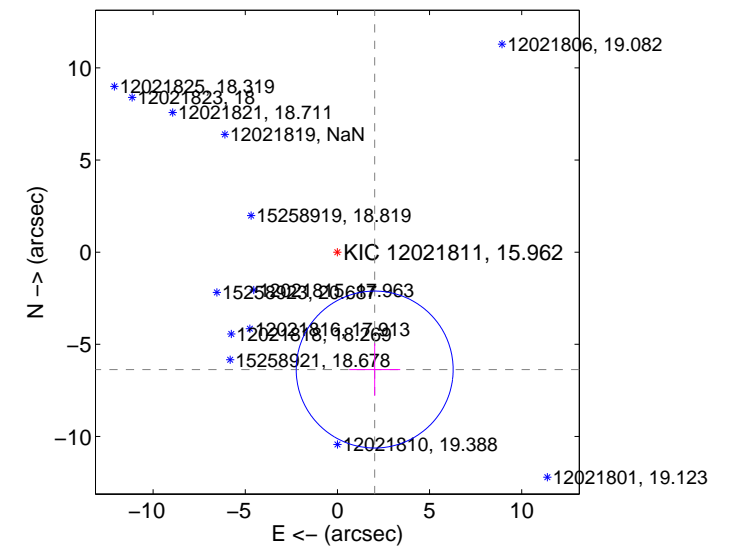
There is no PRF-fit offset from OOT-fit



There is no PRF-fit offset from KIC

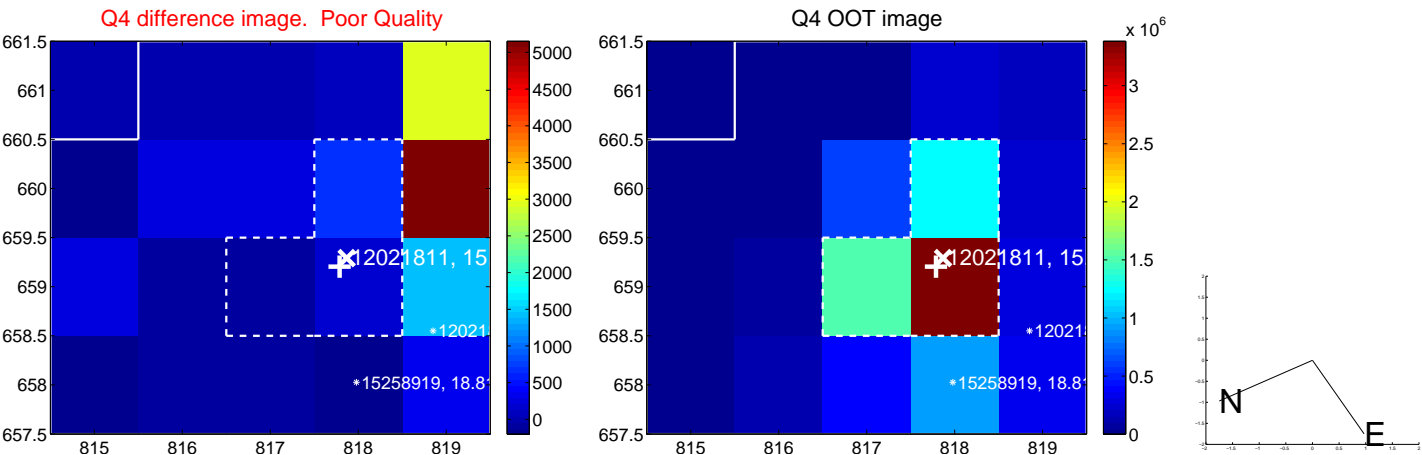
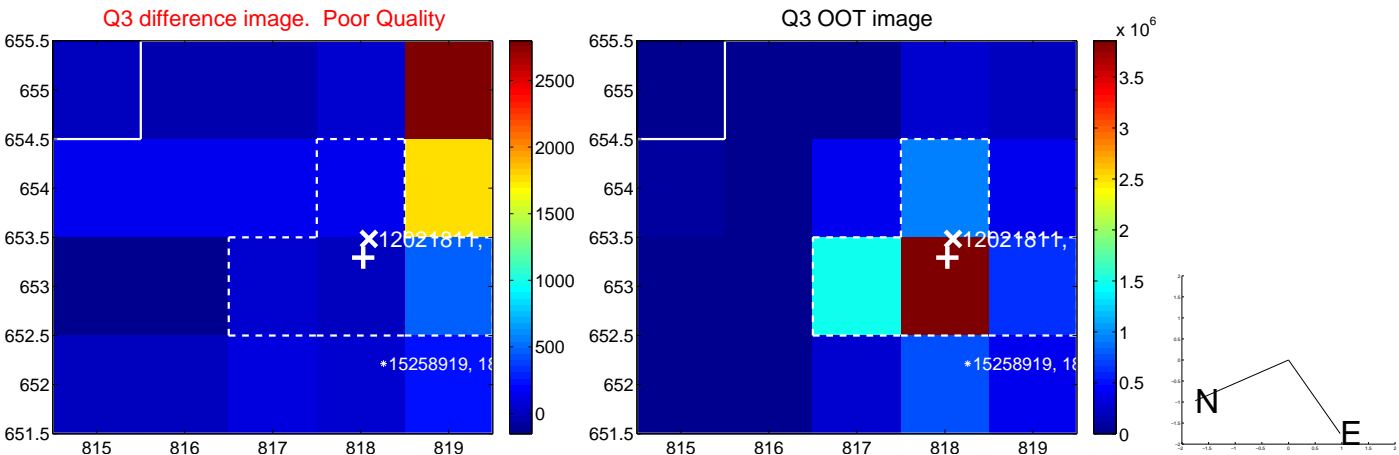
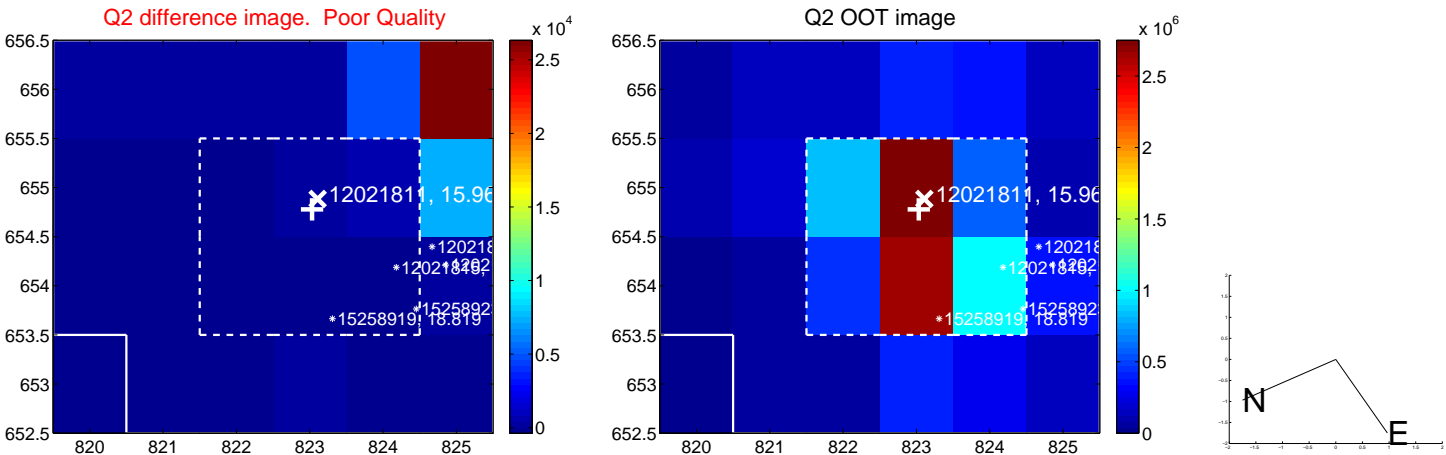
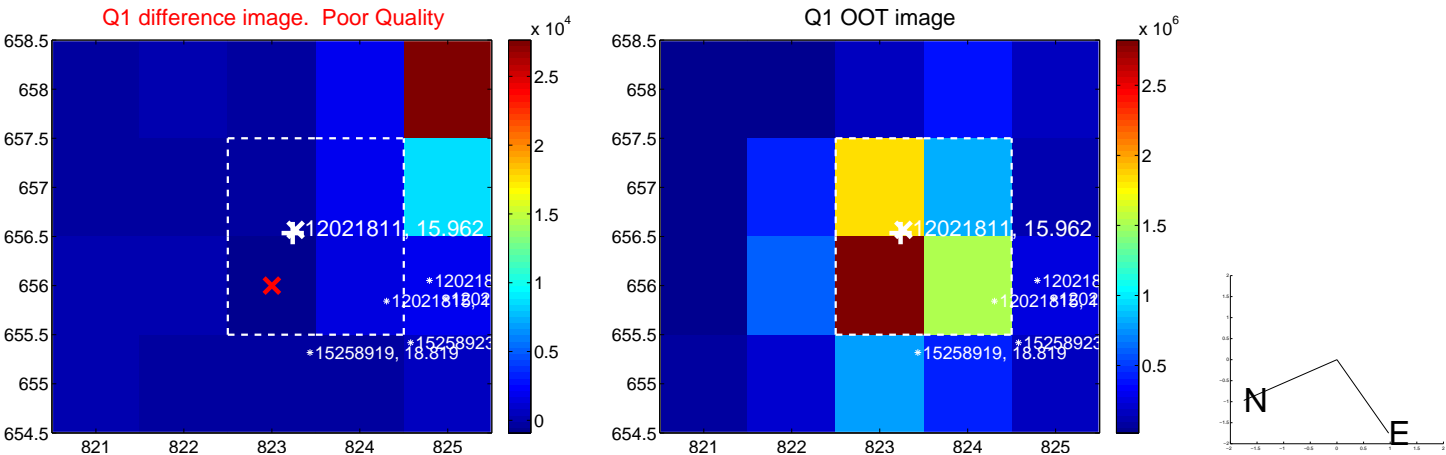


offset from photometric centroids

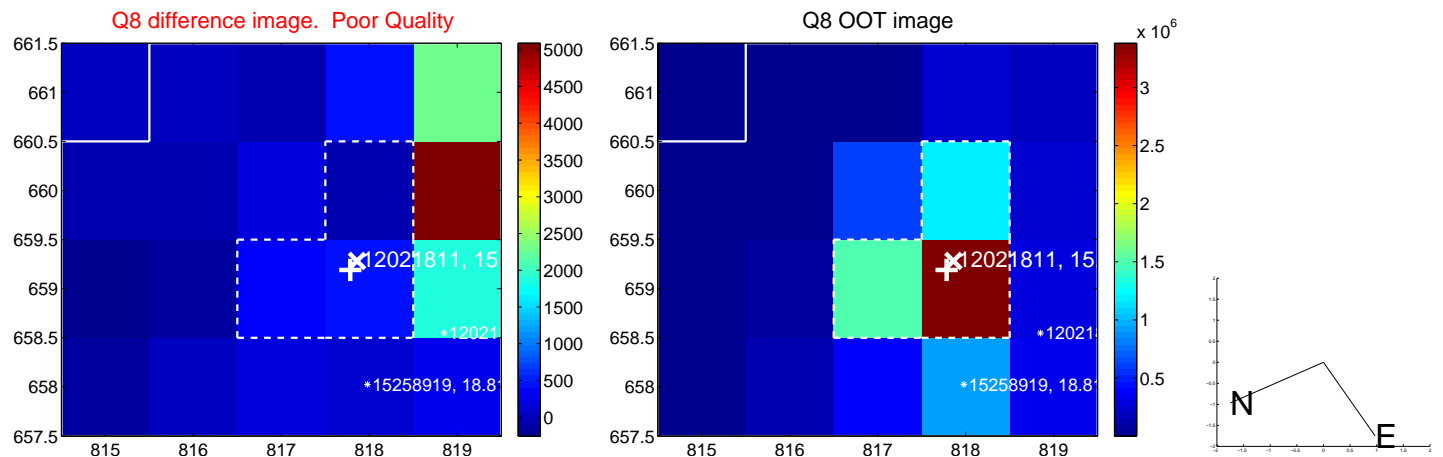
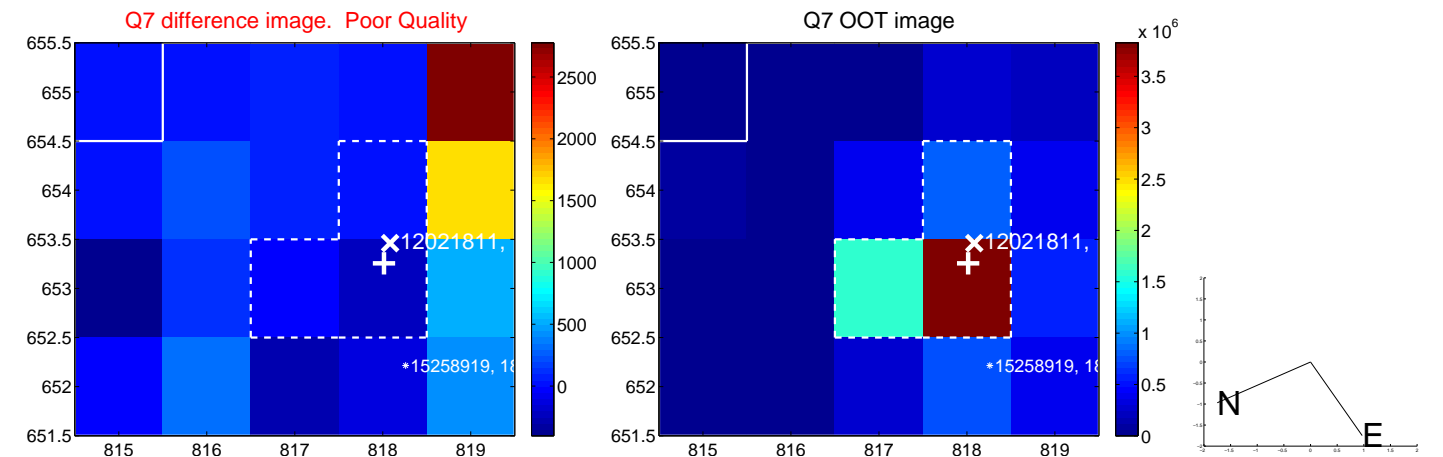
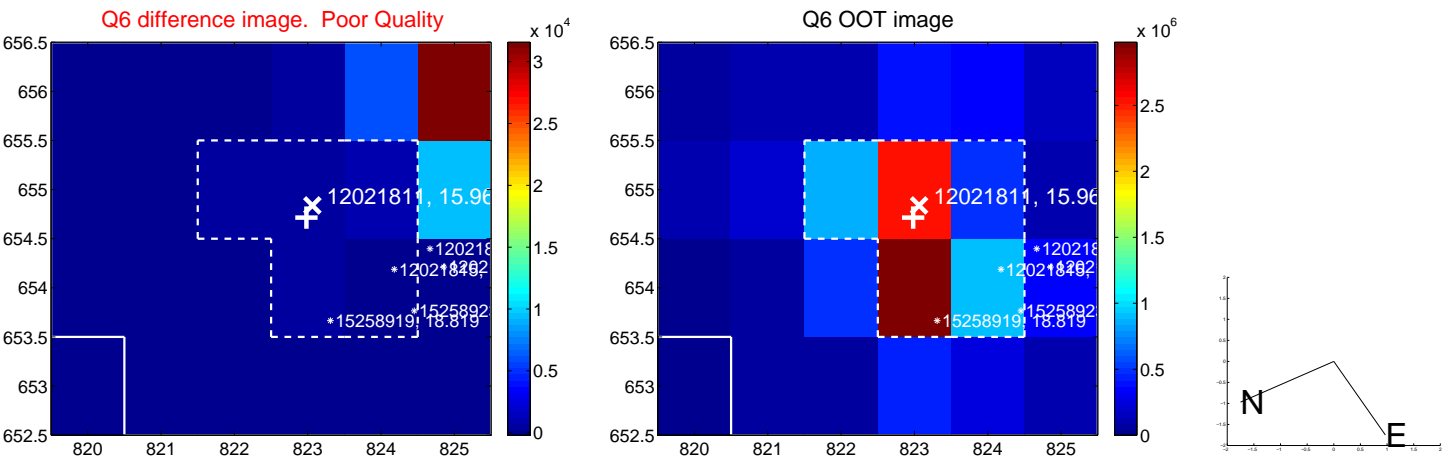
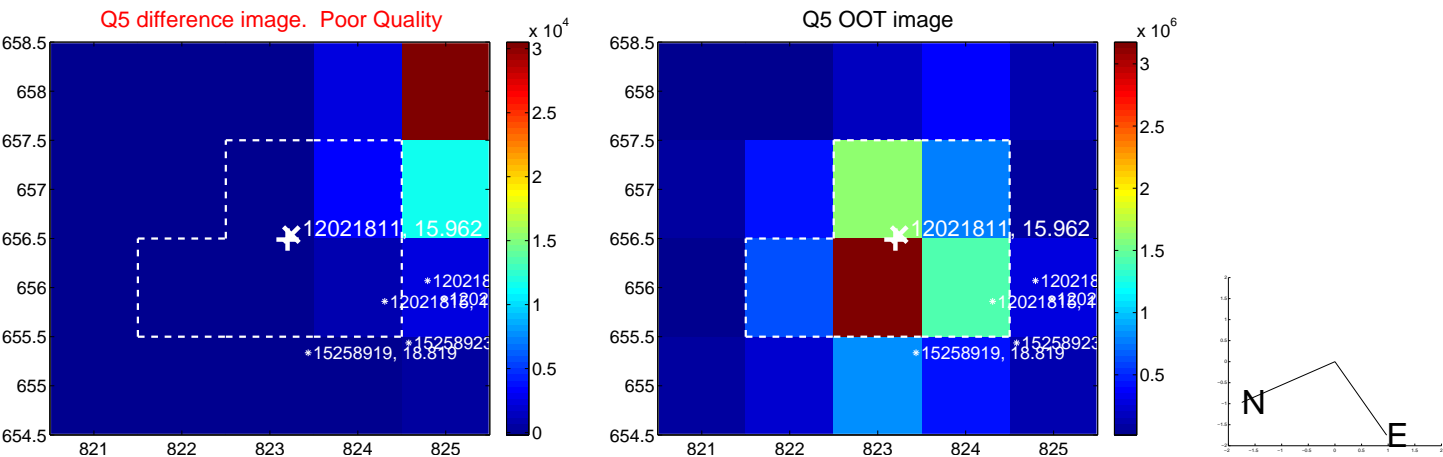


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

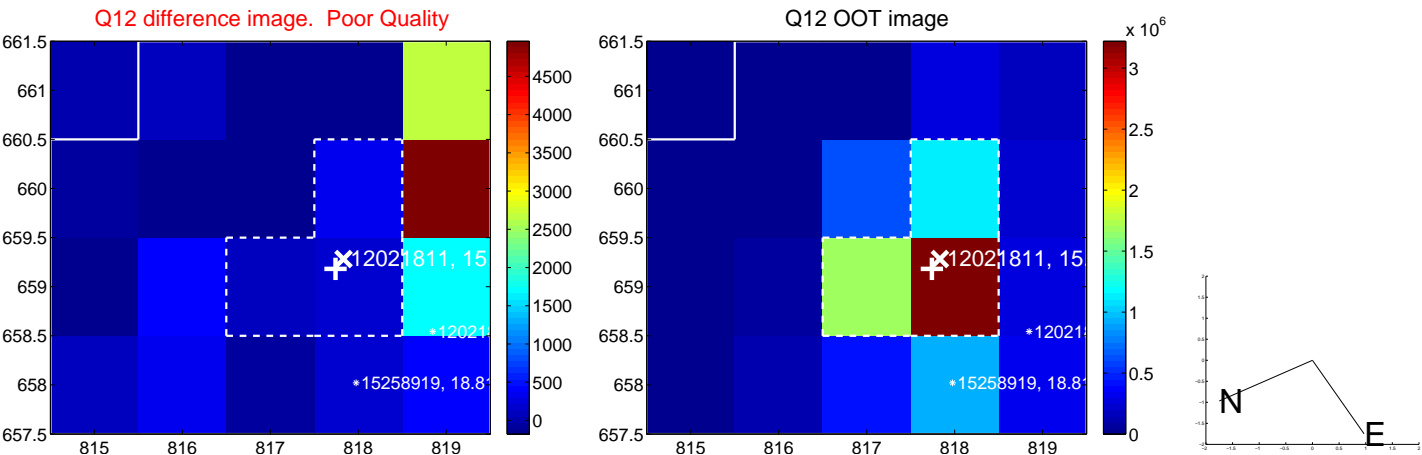
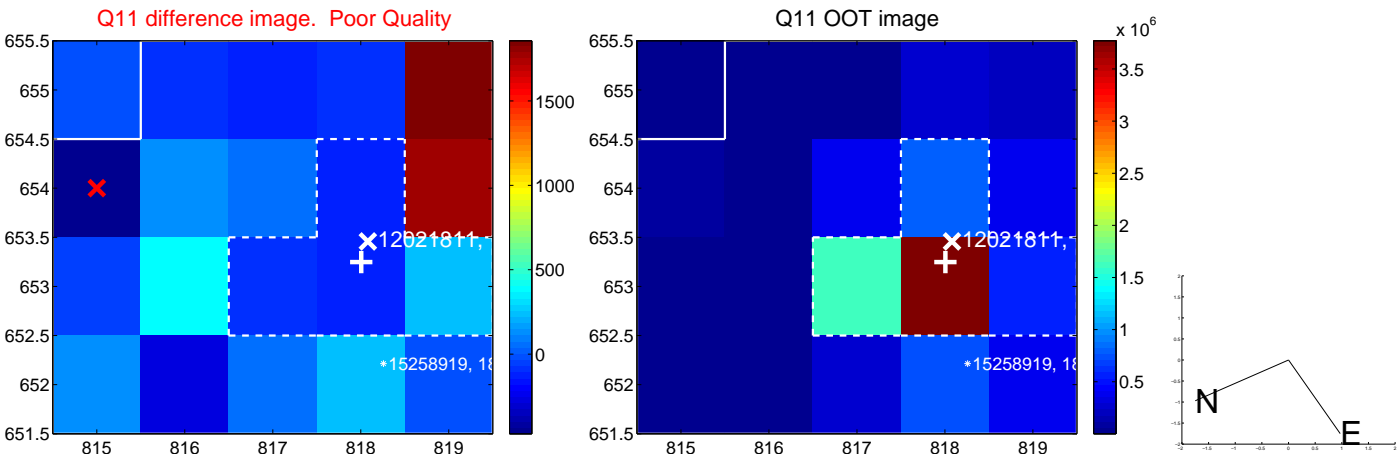
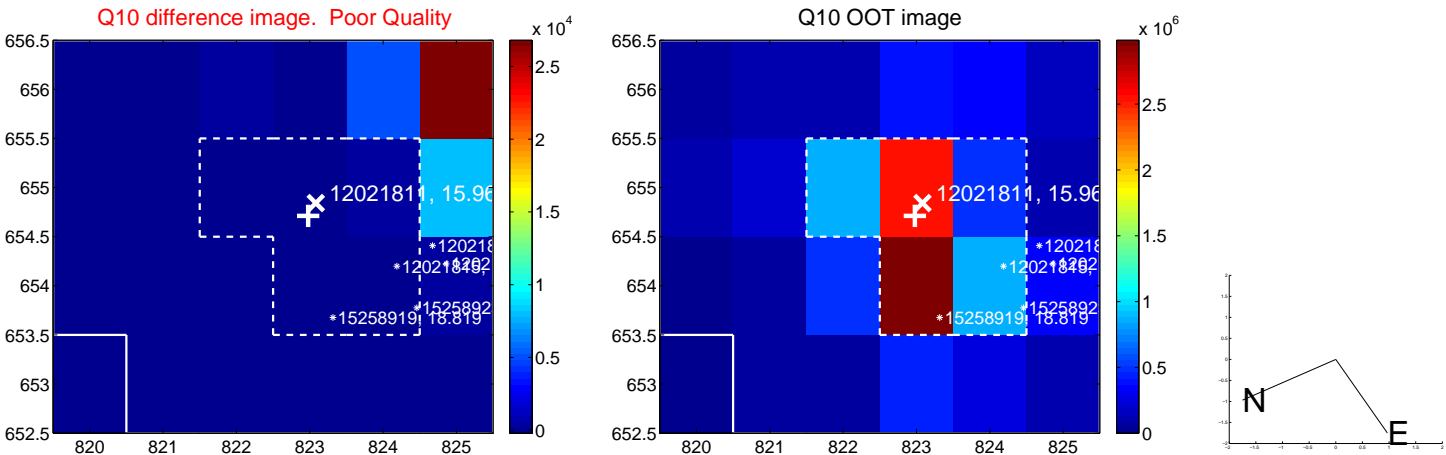
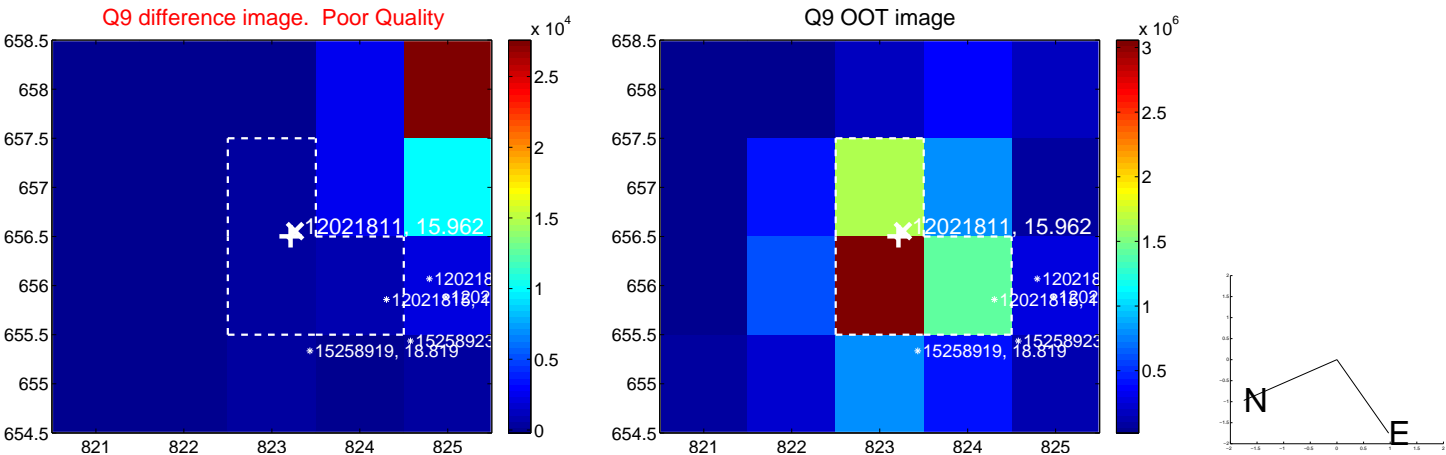


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

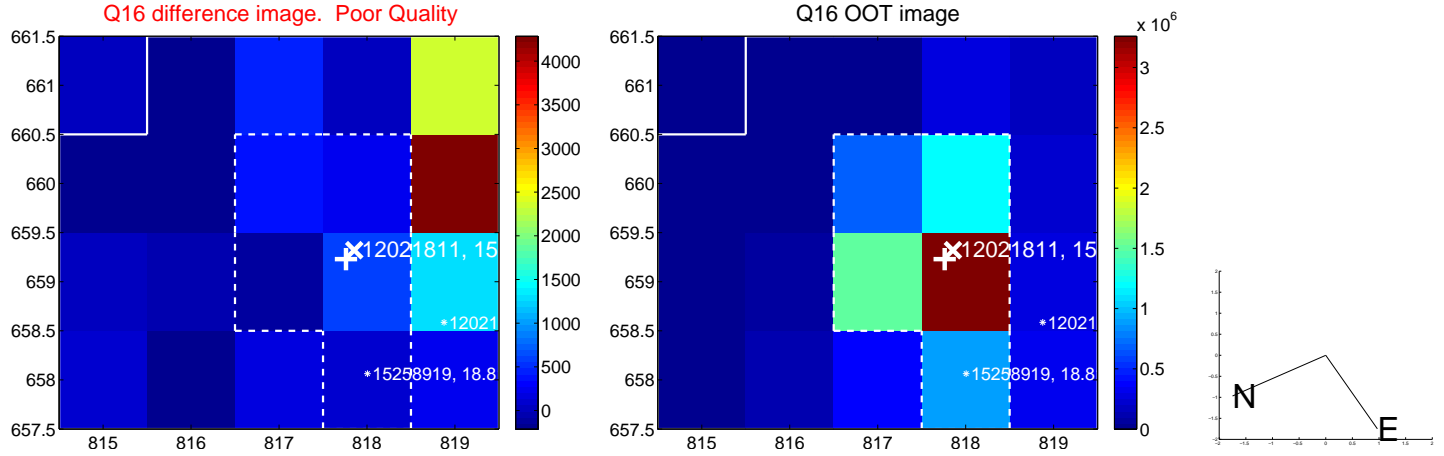
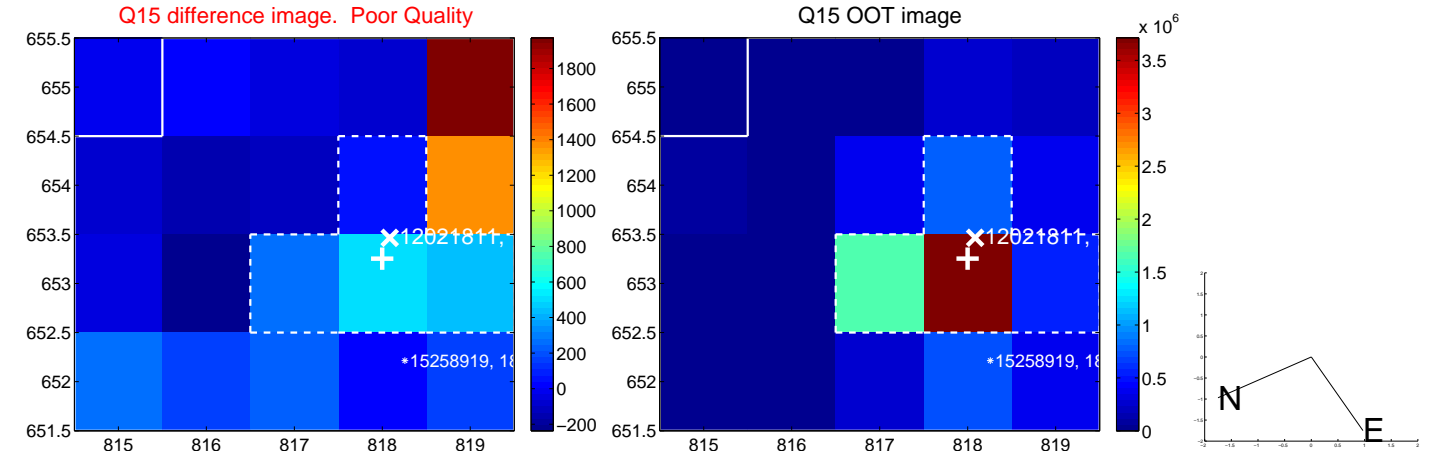
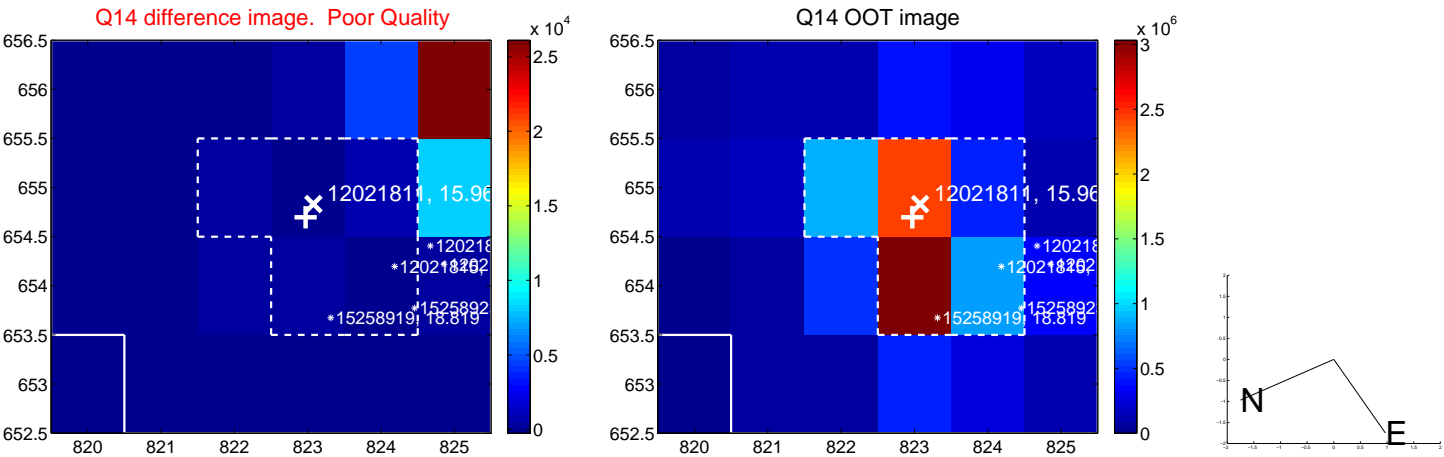
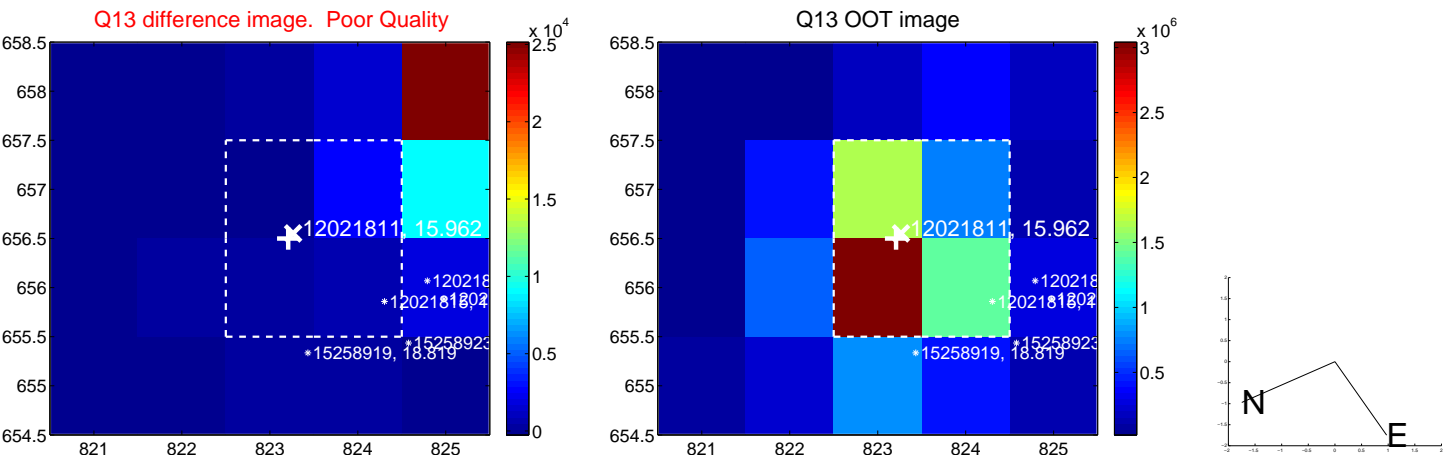




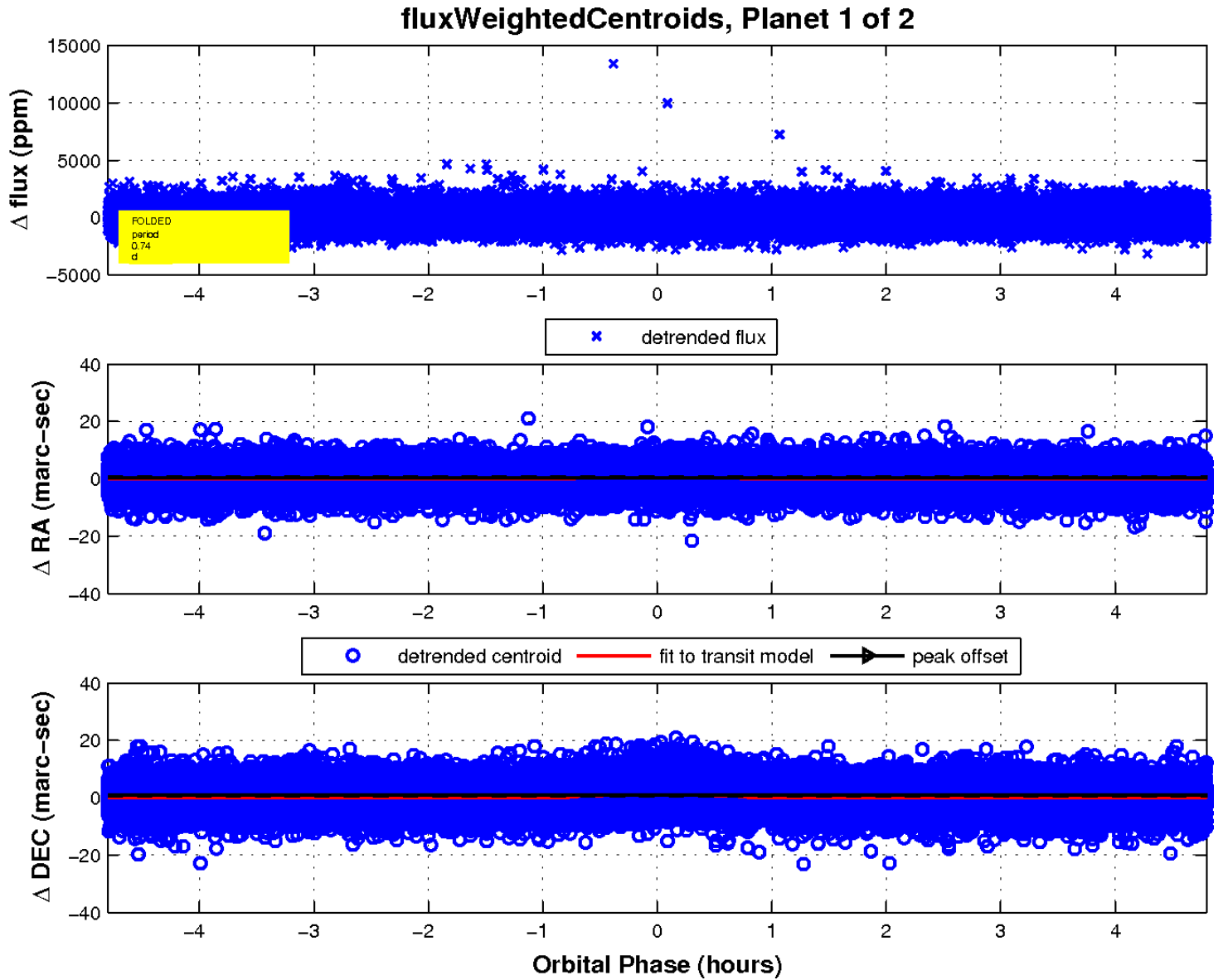
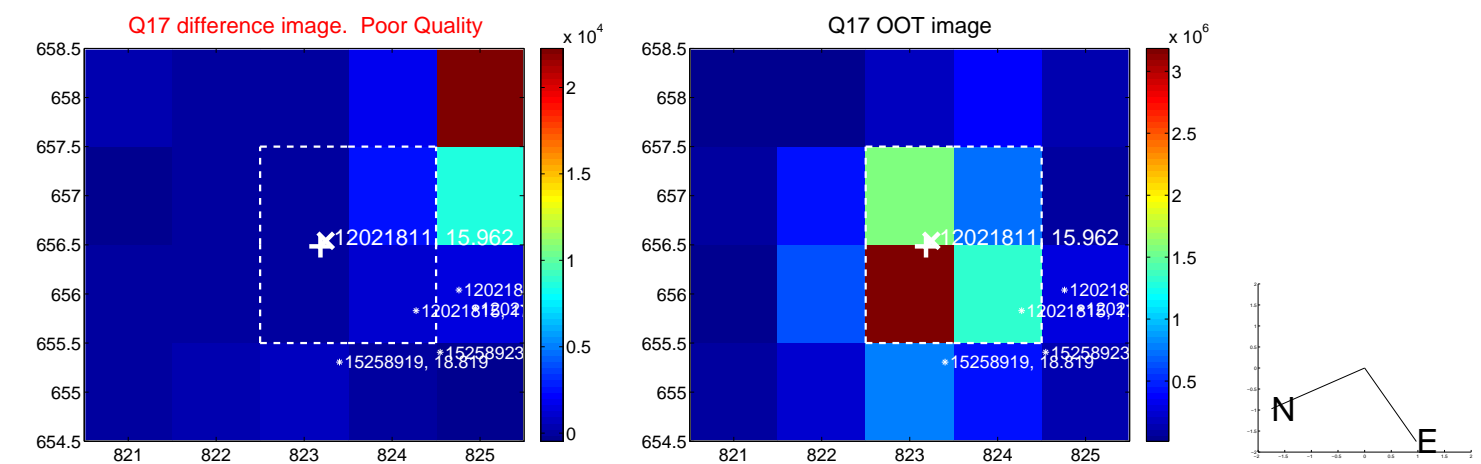
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

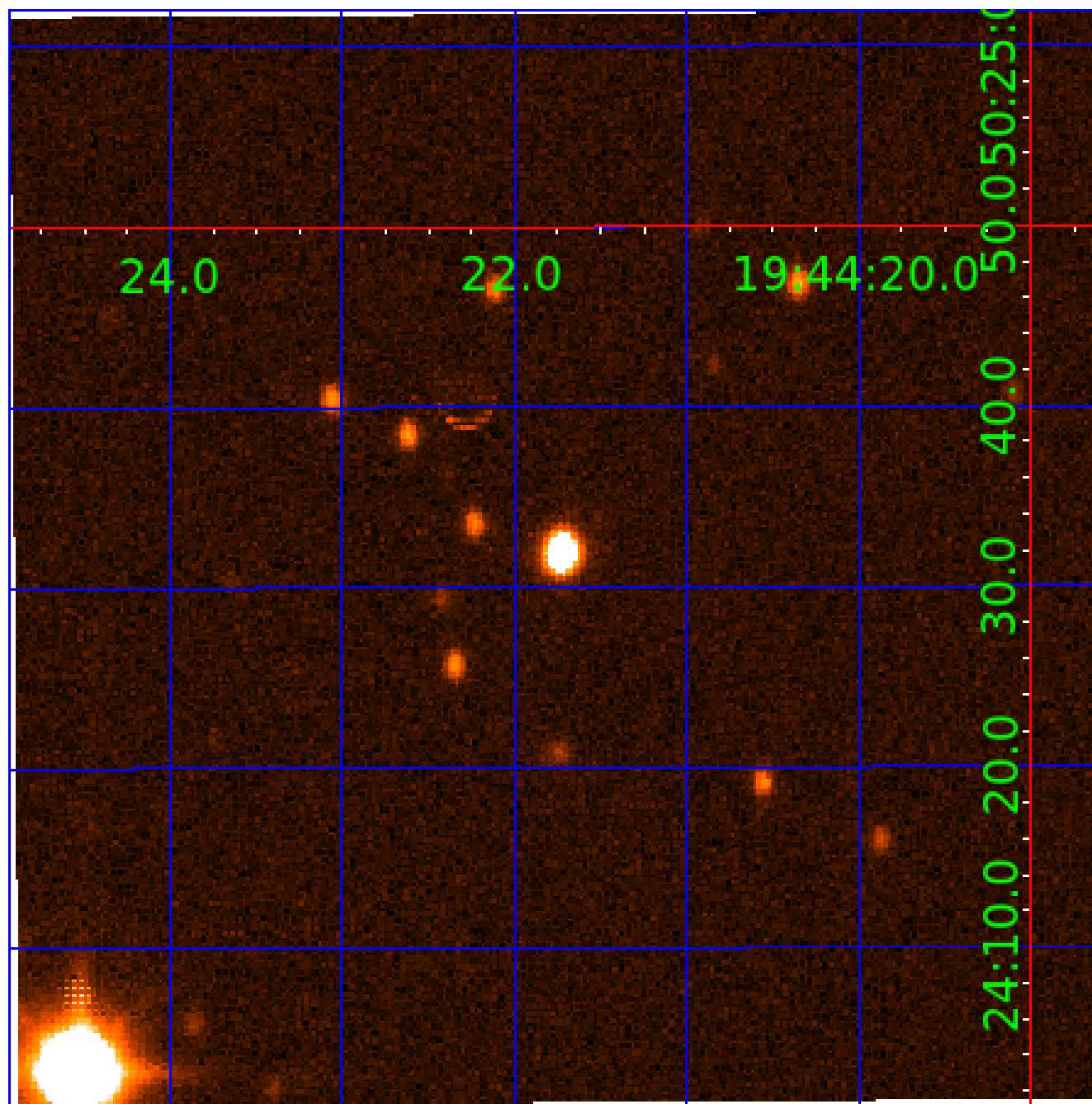


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



UKIRT Image

Declination





# KIC 012021811

## Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	$R_{\star}$ ( $R_{\odot}$ )	$T_{\star}$ (K)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
012021811-01	OBS	4905.01	0.739390	131.709570	123.4	1.600	9.4	9.8	0.62	4205	0.85	590.09
012021811-02	OBS	No	0.739407	132.062419	129.1	1.647	9.0	10.9	0.62	4205	0.87	590.07

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012021811-01	OBS	FP	0.00	1	0	1	0	LPP_DV—MOD_NONUNIQ_ALT—CENT_RESOLVED_OFFSET
012021811-02	OBS	FP	0.00	1	0	1	0	LPP_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_RESOLVED_OFFSET

**Notes:** OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

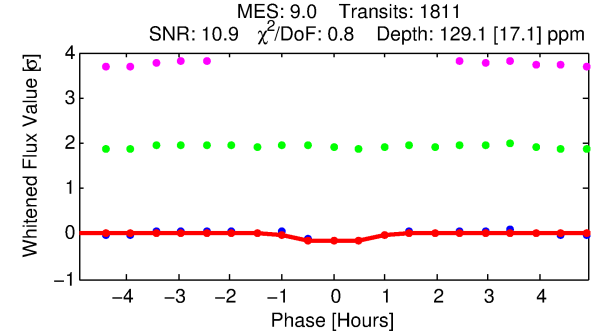
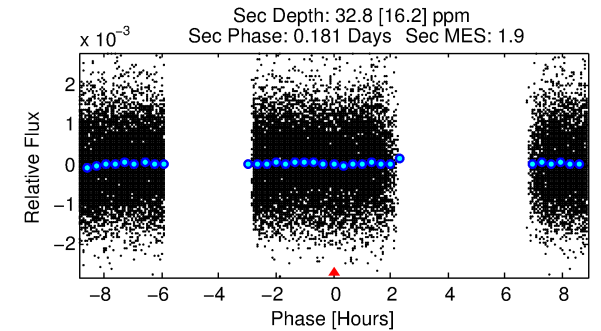
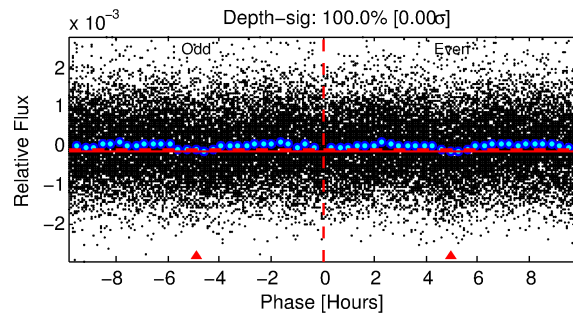
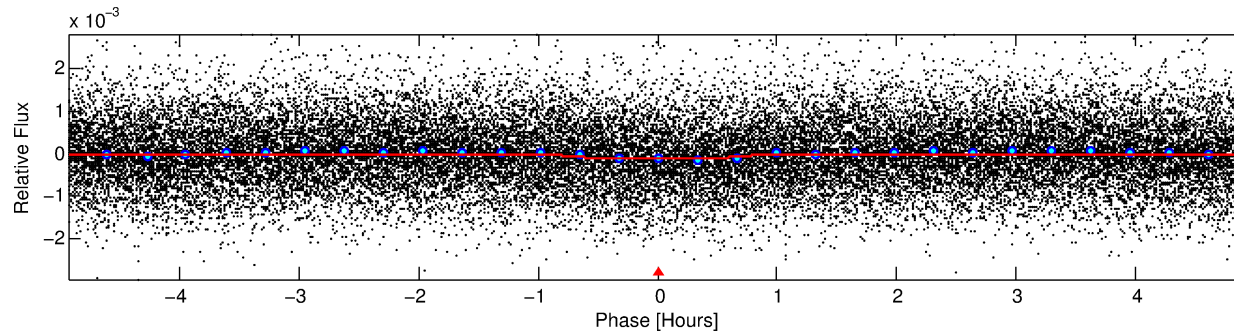
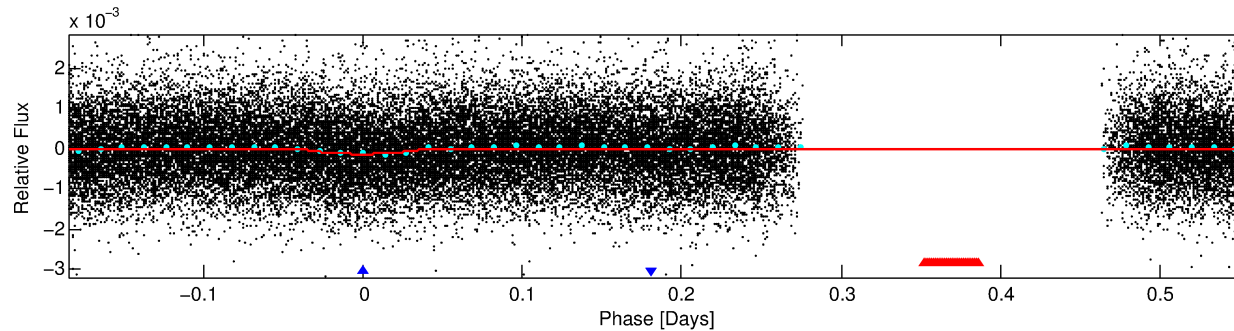
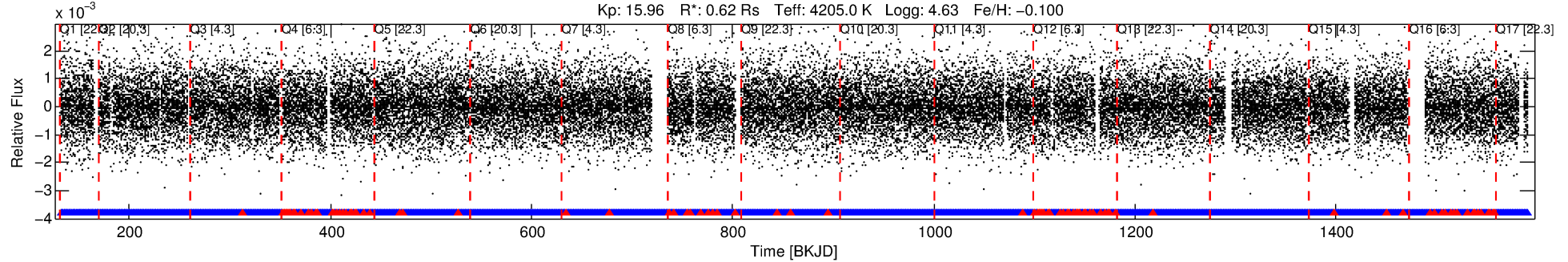
## Ephemeris Match Information For 012021811-02

No Significant Match Found

# DV One-Page Summary

KIC: 12021811 Candidate: 2 of 2 Period: 0.739 d  
KOI: K04905 Corr: No Ephemeris Match

Kp: 15.96 R\*: 0.62 Rs Teff: 4205.0 K Logg: 4.63 Fe/H: -0.100



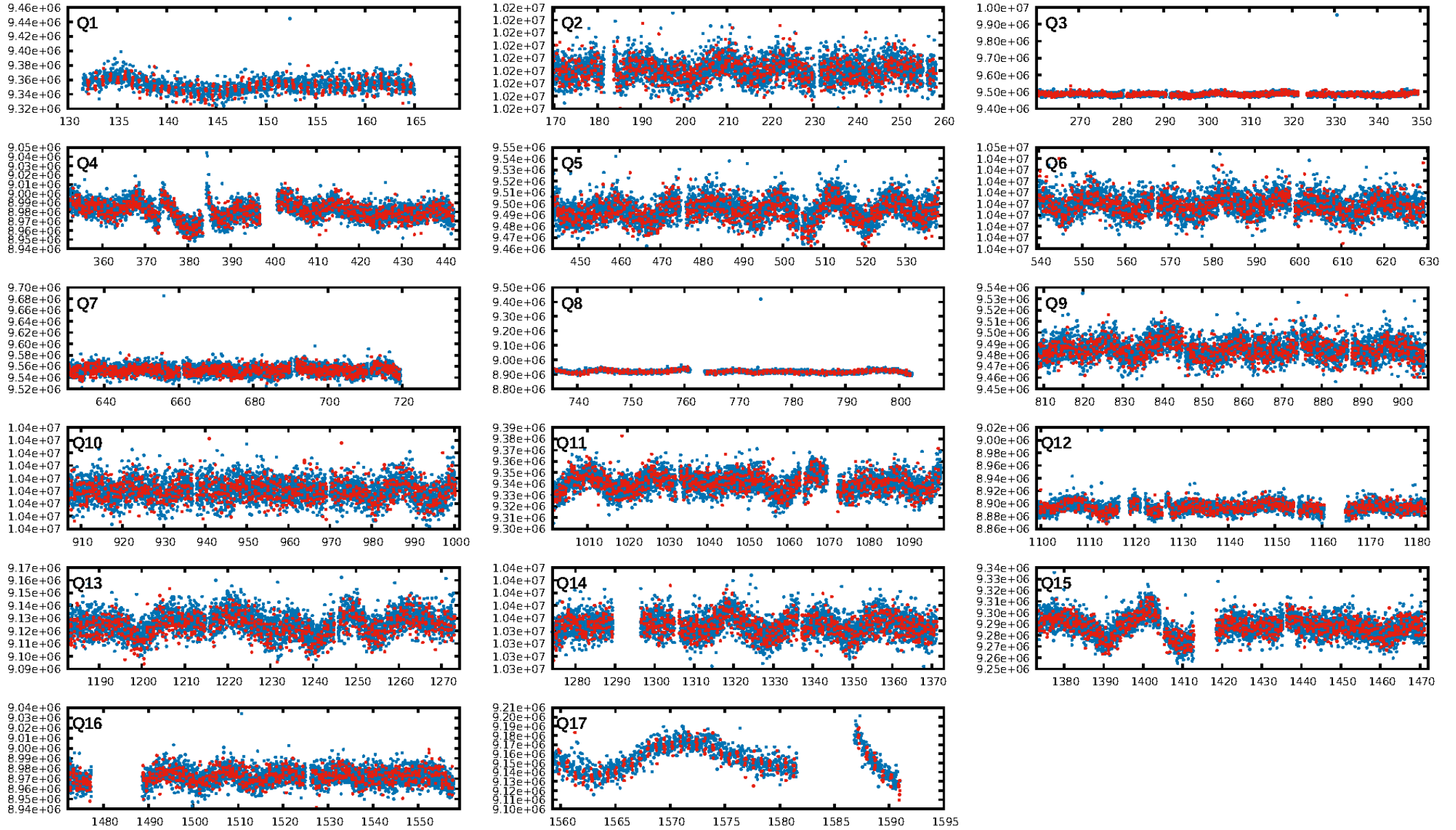
## DV Fit Results:

Period = 0.73941 [0.00001] d  
Epoch = 132.0624 [0.0023] BKJD  
Rp/R\* = 0.0128 [0.0144]  
a/R\* = 1.85 [5.85]  
b = 0.90 [0.97]  
Seff = 590.07 [93.47]  
Teq = 1257 [50] K  
Rp = 0.87 [0.98] Re  
a = 0.0136 [0.0010] AU  
Ag = 4.43 [10.22] [0.34σ]  
Teffp = 2818 [1627] K [0.96σ]

## DV Diagnostic Results:

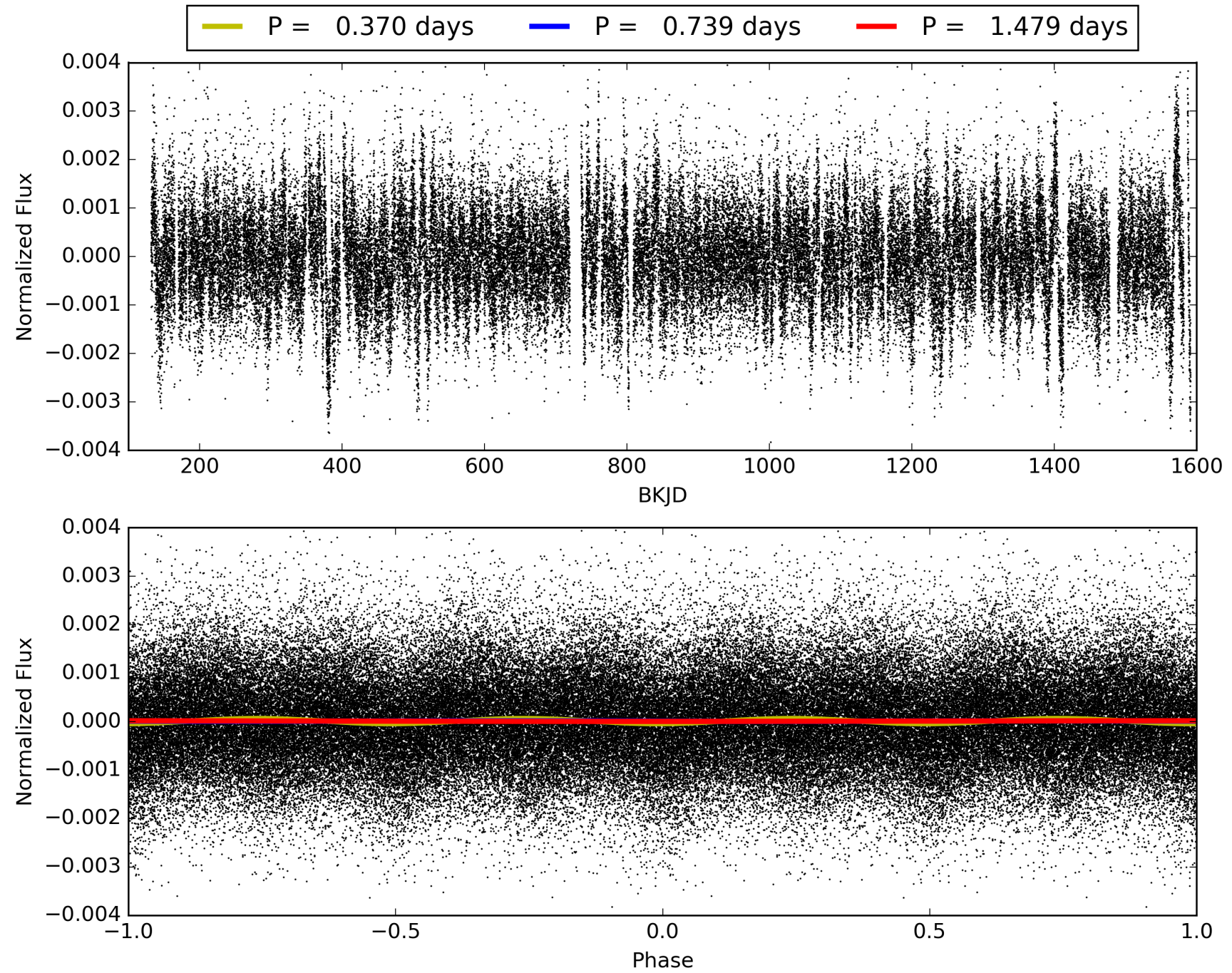
ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 4.62e-20  
RollingBand-fgt: 0.94 [1632/1730]  
GhostDiagnostic-chr: -1.021  
Centroid-sig: 0.0%  
Centroid-so: 6.085 arcsec [4.54σ]  
OotOffset-rm: N/A  
KicOffset-rm: N/A  
OotOffset-st: 0/0/0/0 [0]  
KicOffset-st: 0/0/0/0 [0]  
DiffImageQuality-fgm: N/A  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 012021811-02, PDC Light Curves



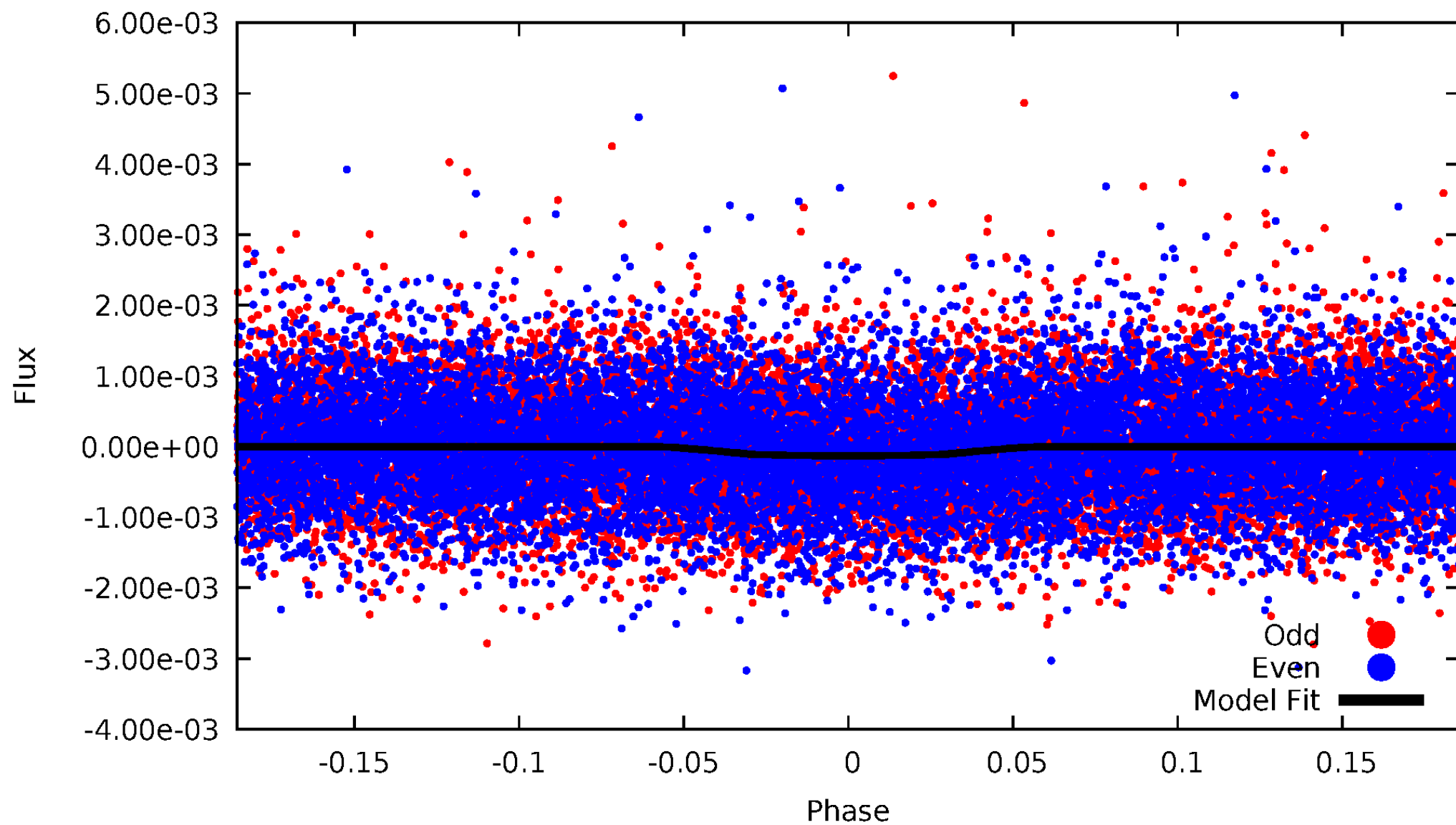


# TCE 012021811-02



# DV Odd/Even

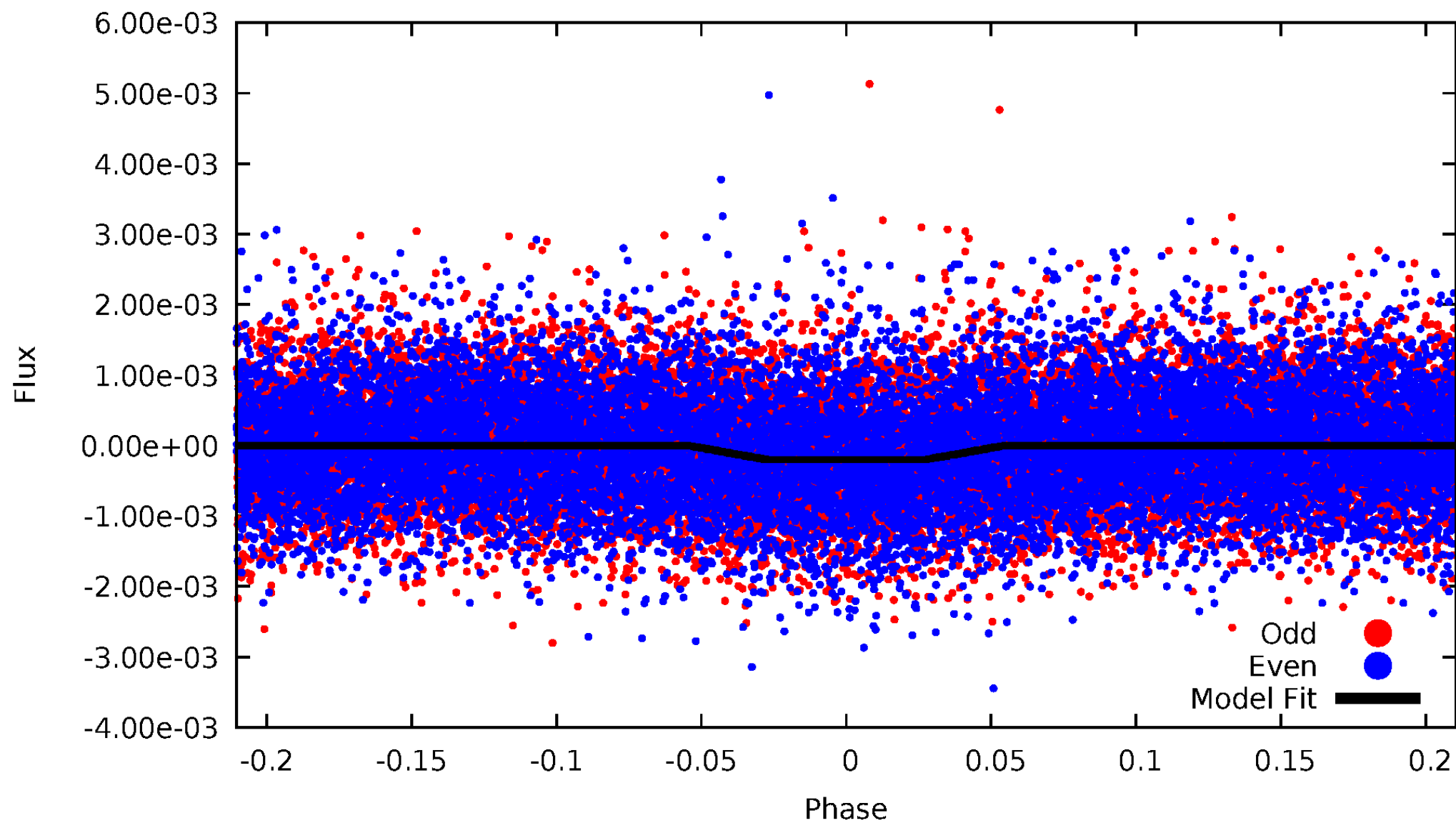
TCE 012021811-02





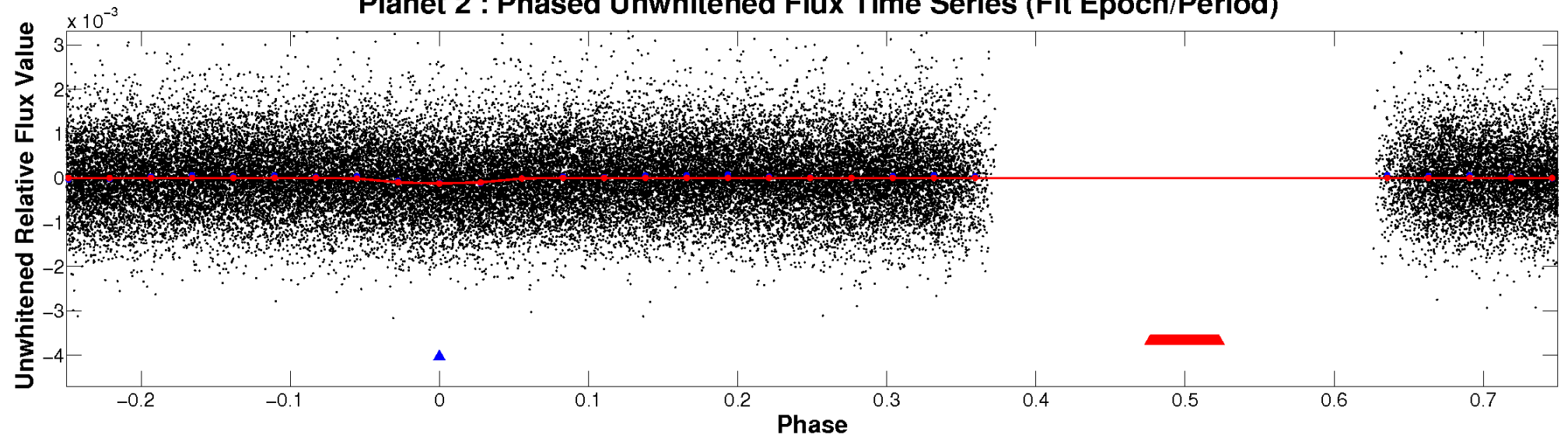
# ALT Odd/Even

TCE 012021811-02

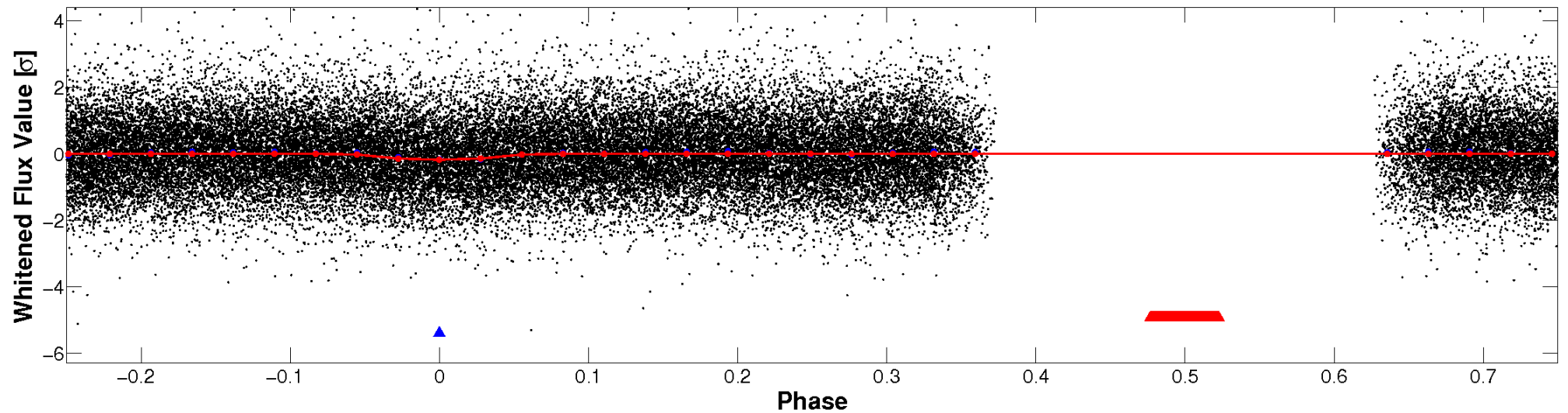


# Non-Whitened Vs. Whitened Light Curve

## Planet 2 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

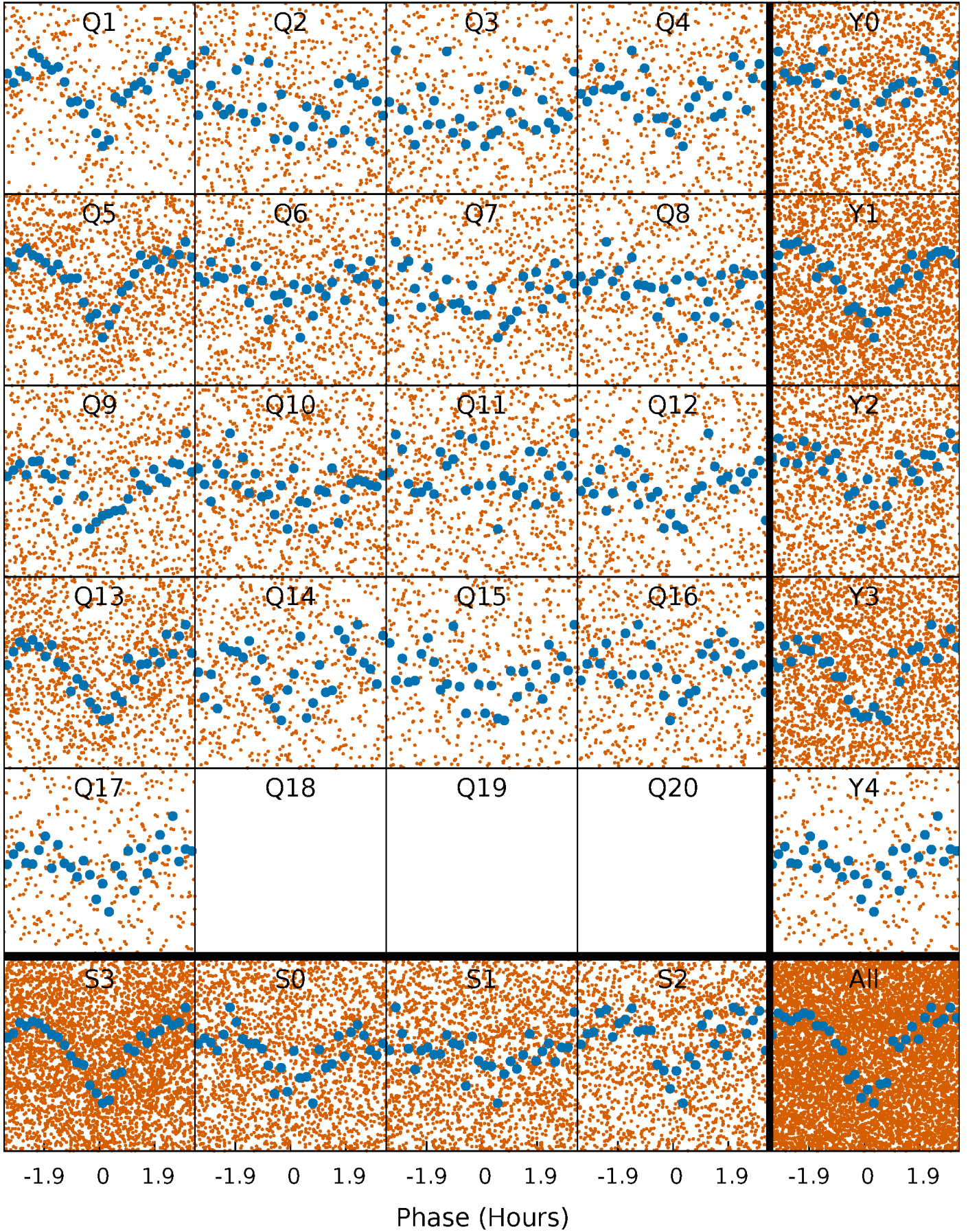


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

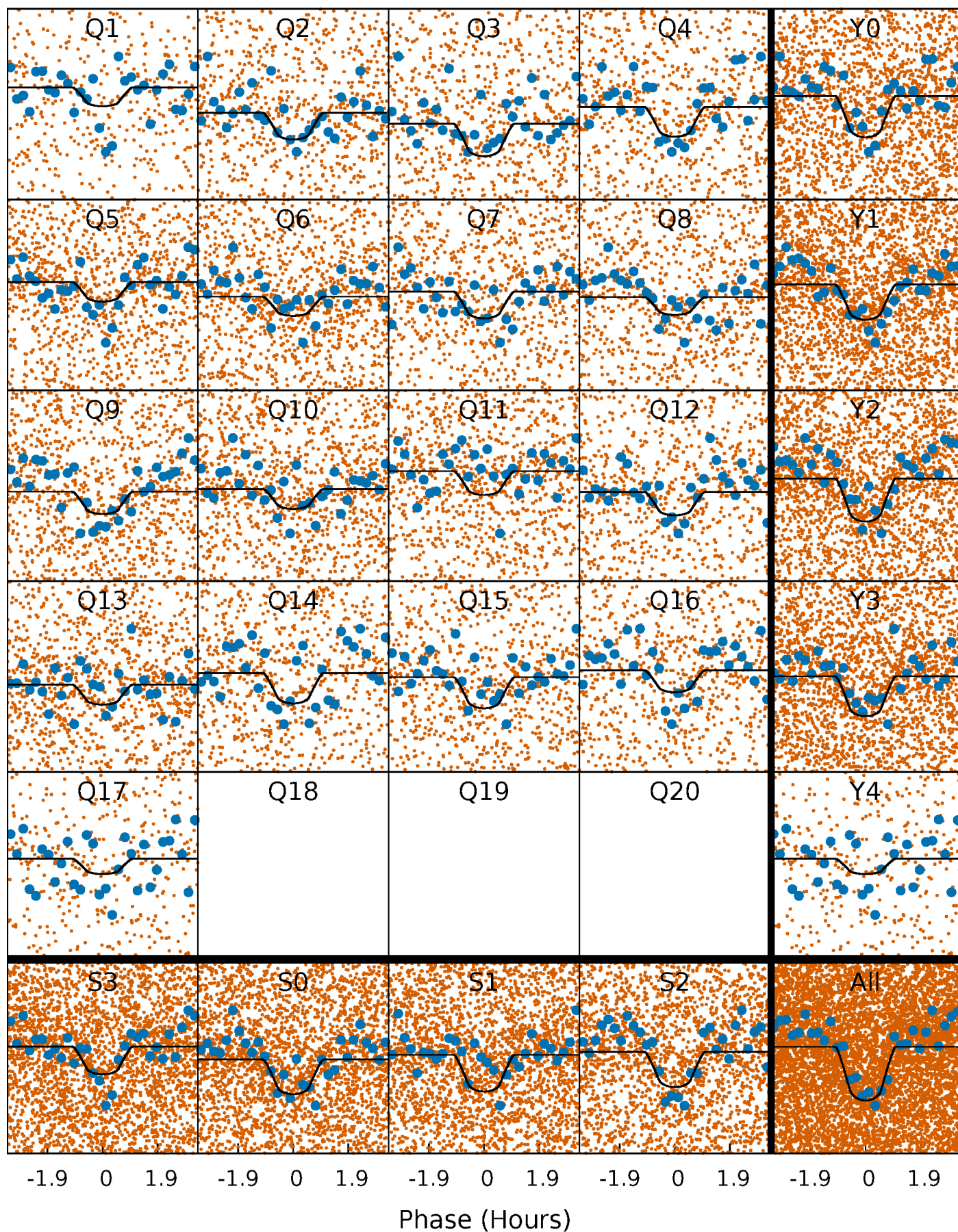
TCE 012021811-02   P= 0.739407 Days    $T_0=132.062419$  (BKJD)





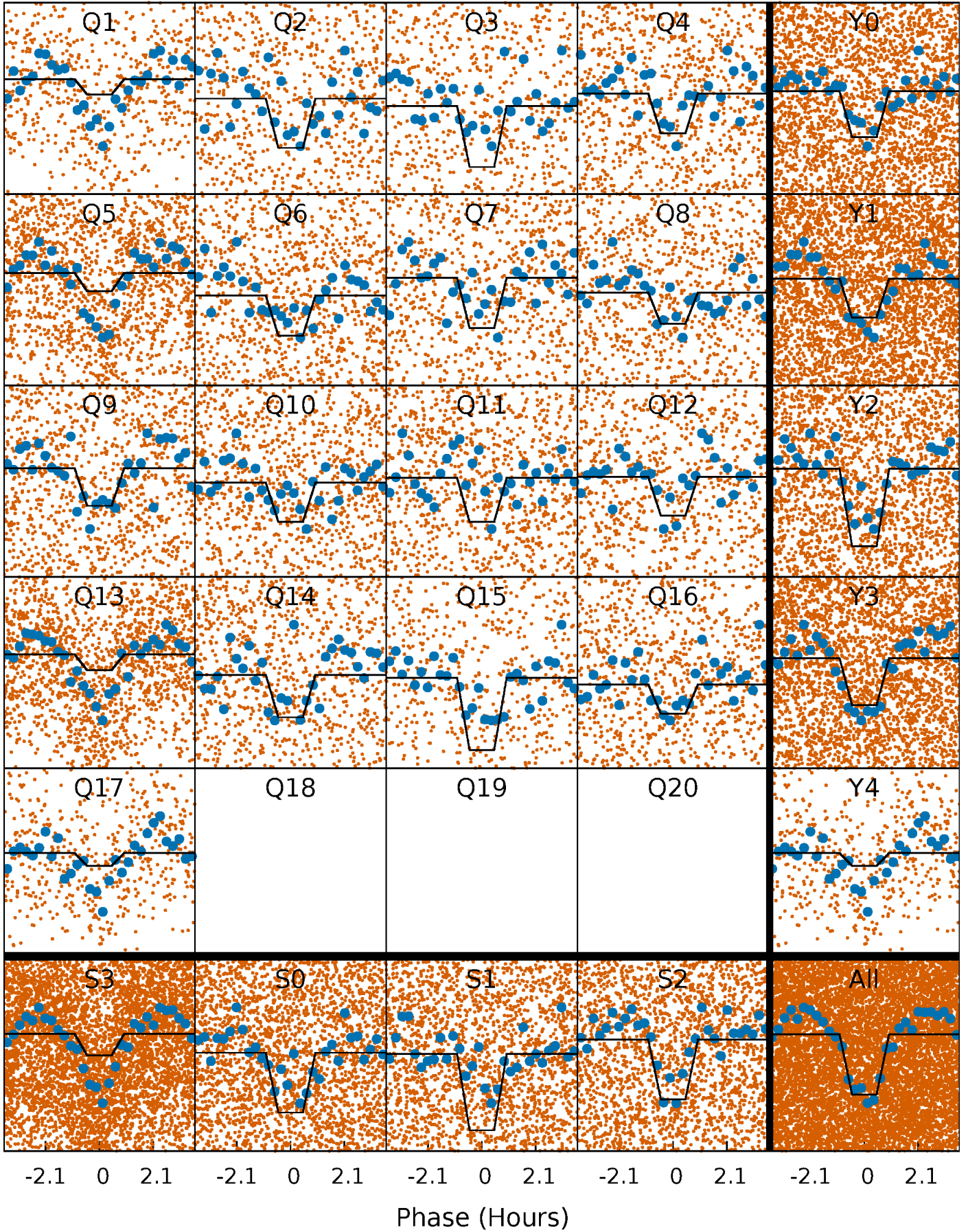
# DV Quarter-Phased Transit Curves

TCE 012021811-02 P= 0.739407 Days  $T_0=132.062419$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 012021811-02 P= 0.739412 Days  $T_0=132.061935$  (BKJD)

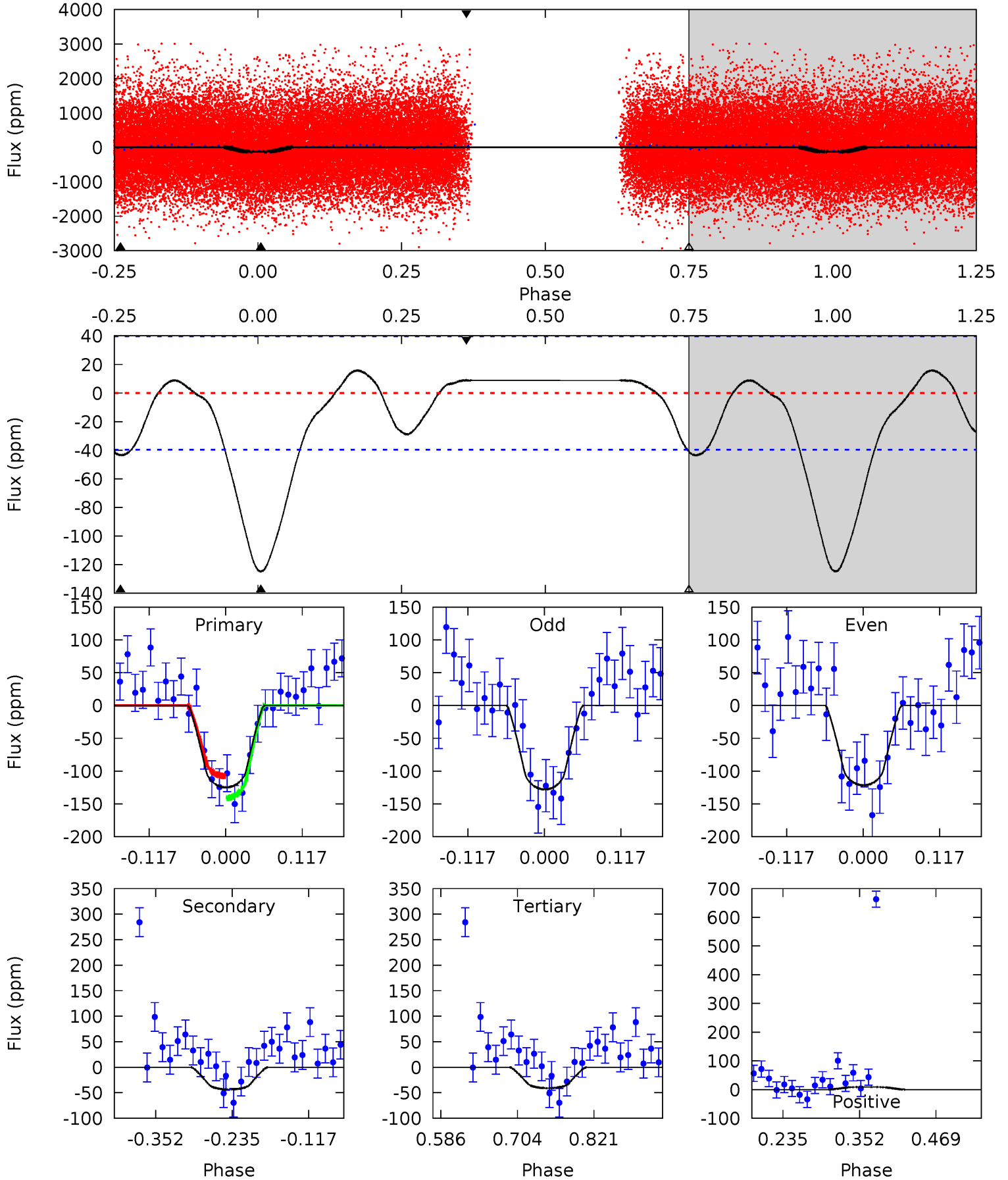




# DV Model-Shift Uniqueness Test

012021811-02, P = 0.739407 Days, E = 131.323012 Days

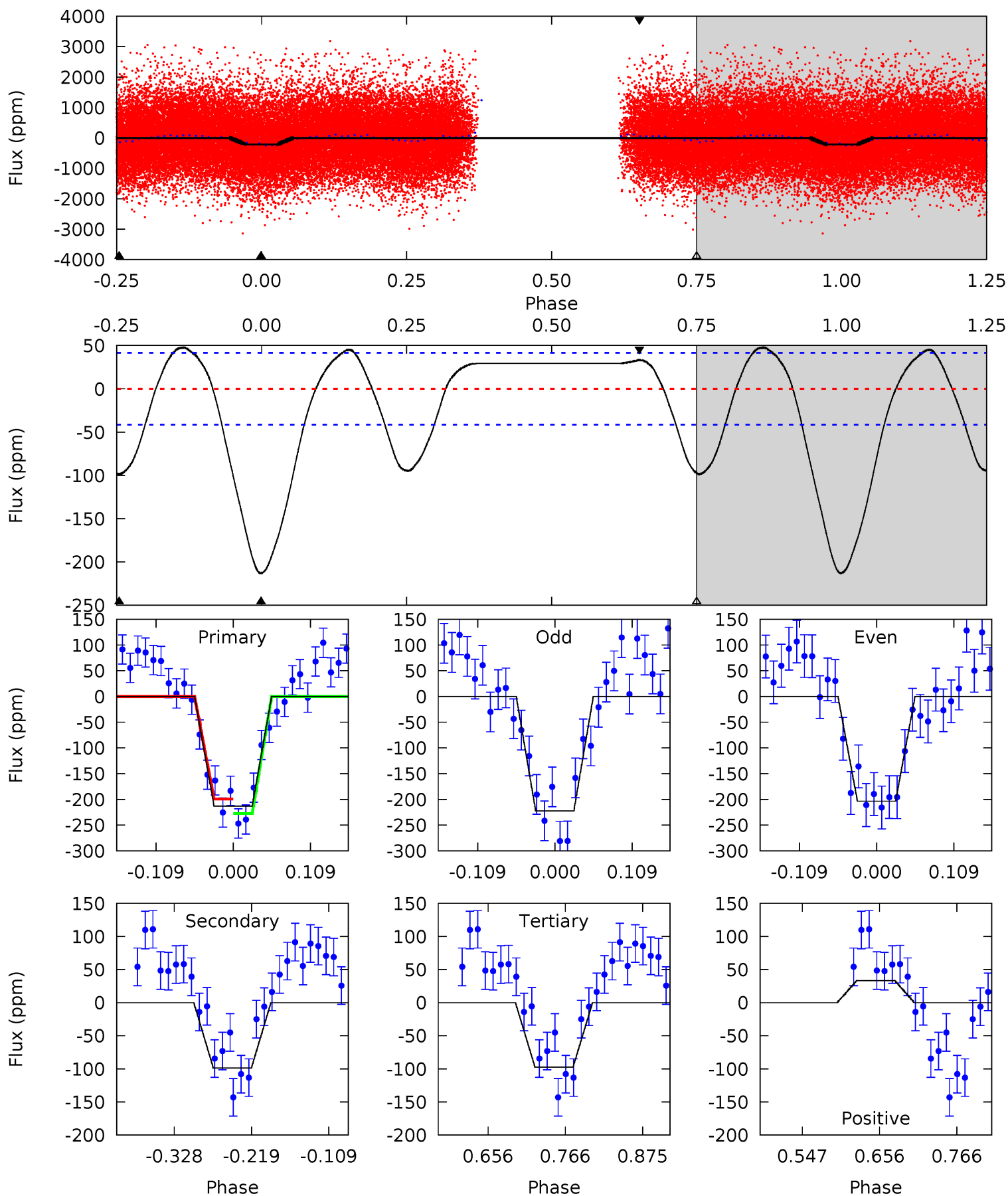
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.3	4.99	4.69	1.04	4.53	1.57	1.70	9.58	13.2	0.30	3.95	0.36	0.93	0.11	1.94



# Alt Model-Shift Uniqueness Test

012021811-02, P = 0.739412 Days, E = 131.322523 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
23.3	10.8	10.7	3.64	4.55	1.60	5.34	12.7	19.7	0.15	7.18	1.05	1.04	0.18	1.54



### Stellar Parameters For KIC 012021811

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4205^{+126}_{-126}$	$4.635^{+0.053}_{-0.021}$	$-0.100^{+0.300}_{-0.300}$	$0.624^{+0.040}_{-0.060}$	$0.614^{+0.061}_{-0.055}$	$3.552^{+0.830}_{-0.380}$
	+3%/-3%	+1%/-0%	+300%/-300%	+6%/-10%	+10%/-9%	+23%/-11%
Source	PHO1	KIC0	KIC0	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 012021811-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-44 \pm 9$	$1.04^{+0.90}_{-0.61}$	$1748^{+59}_{-68}$	$3144^{+1175}_{-567}$	$4.096^{+20.877}_{-2.944}$
Alt.	$-99 \pm 9$	$1.13^{+0.87}_{-0.73}$	$1741^{+58}_{-59}$	$3487^{+1549}_{-574}$	$8.023^{+52.529}_{-5.496}$

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

$T_{\text{obs}}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{\text{obs}}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{\text{obs}} \gg T_{\text{max}}$  AND  $A_{\text{obs}} \gg 1.0$

## DV Centroid Data

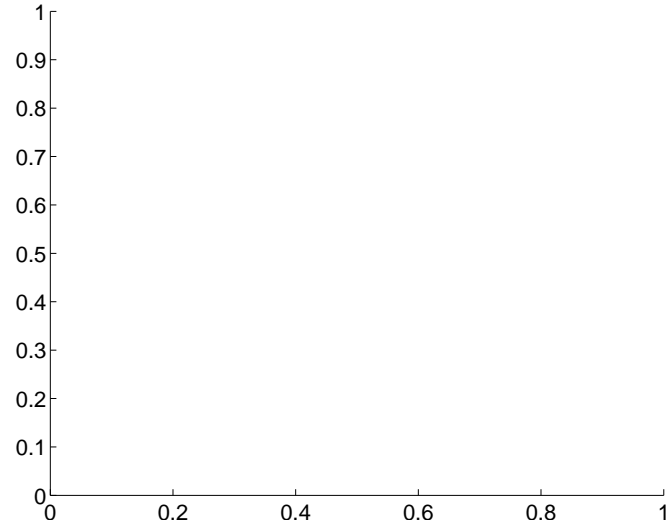
Supplemental centroid analysis for 012021811-02. Kepler magnitude: 15.96. Transit SNR 10.91

There are 0 quarters with good PRF difference image offsets

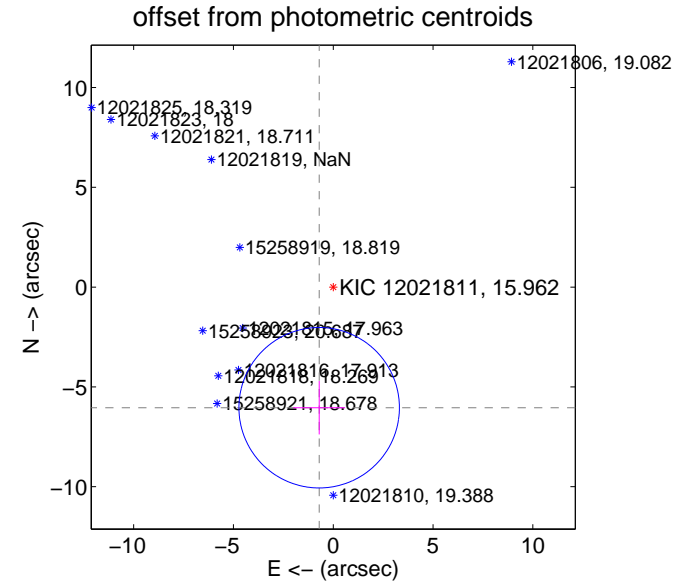
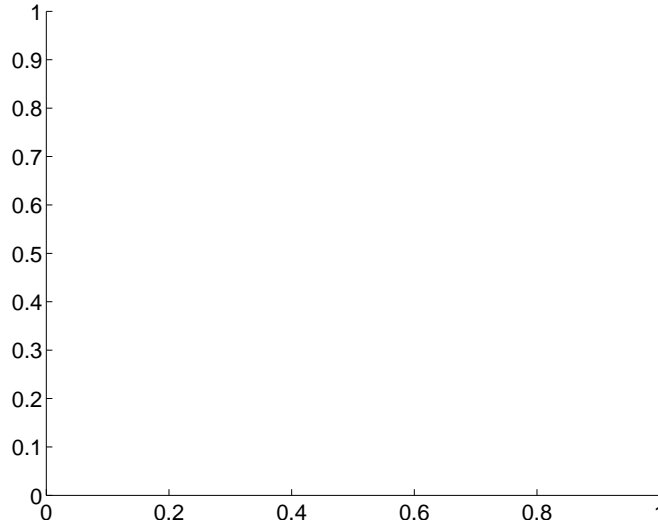
The direct PRF centroid is offset from the target star catalog position by about NaN arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	—	—	—	—
PRF-fit source offset from KIC position	—	—	—	—
photometric centroid source offset	$6.08 \pm 1.34$	4.54	$0.71 \pm 1.30$	$-6.04 \pm 1.34$

There is no PRF-fit offset from OOT-fit

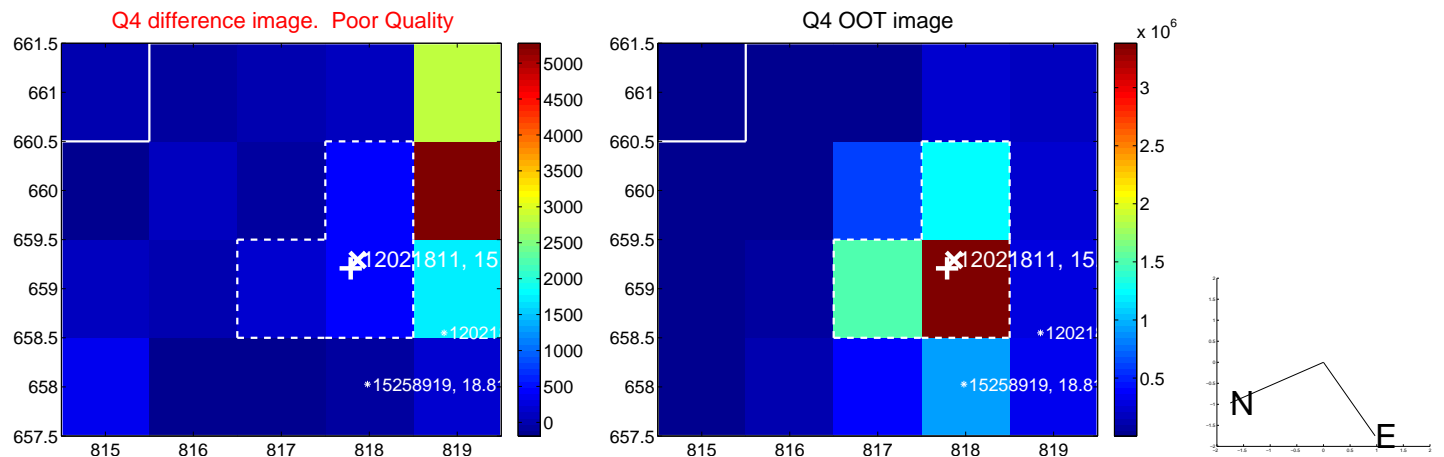
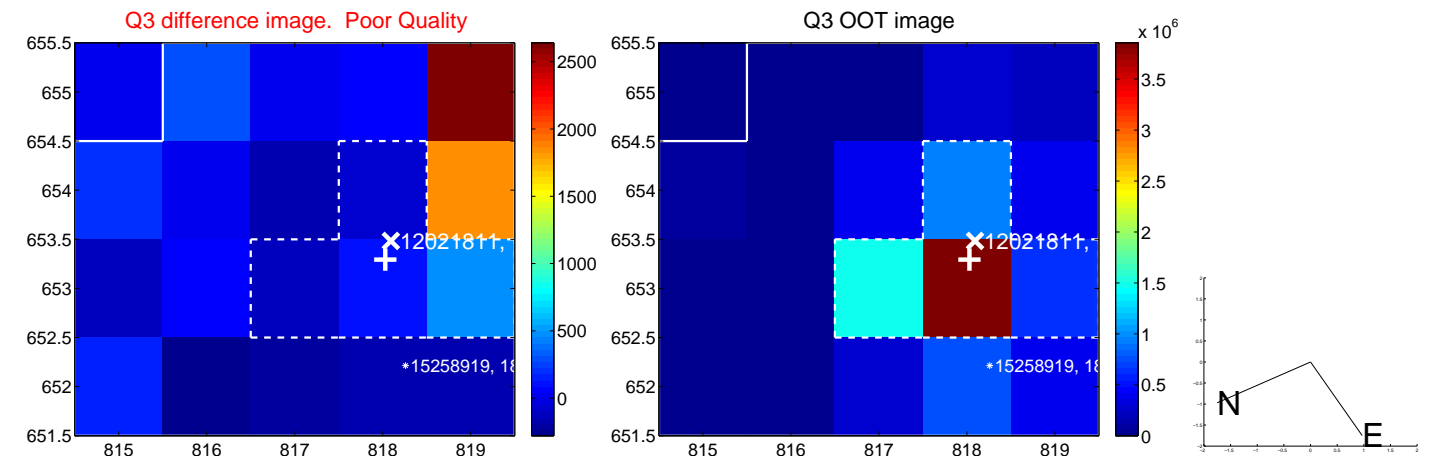
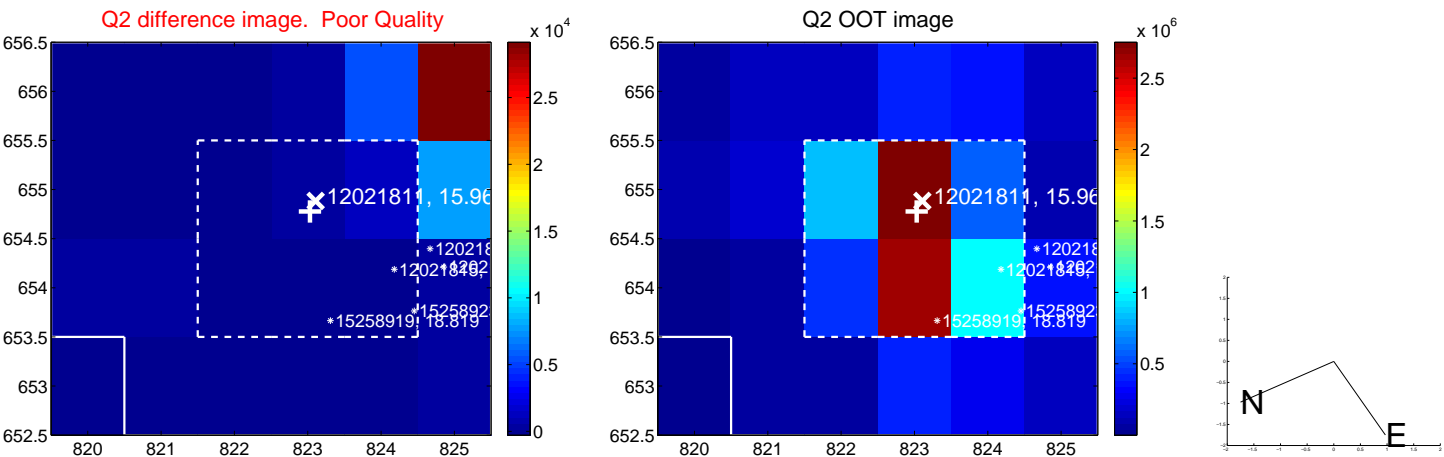
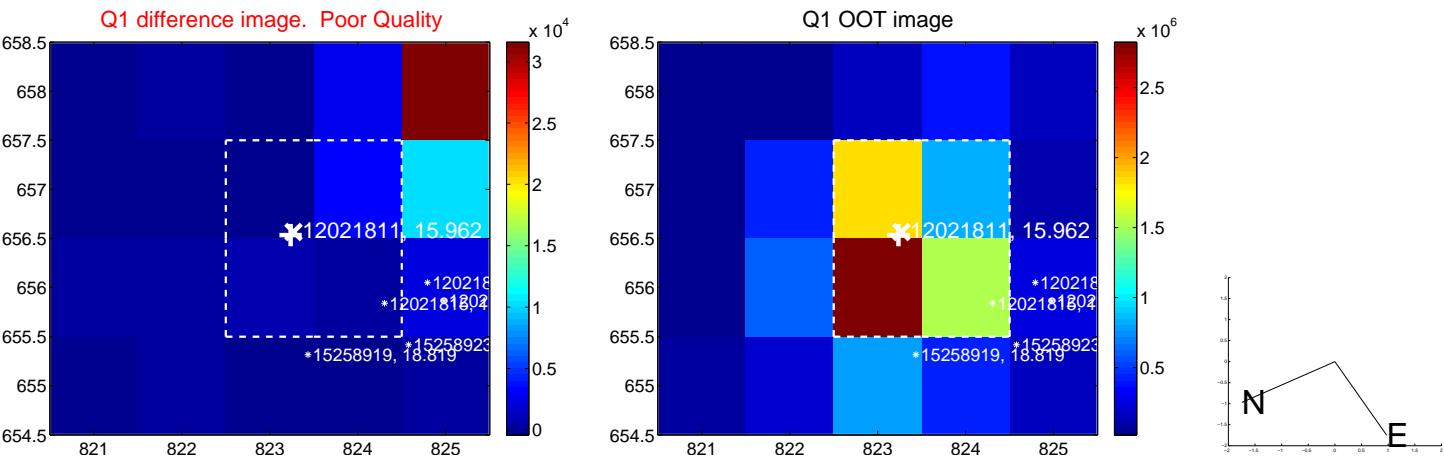


There is no PRF-fit offset from KIC



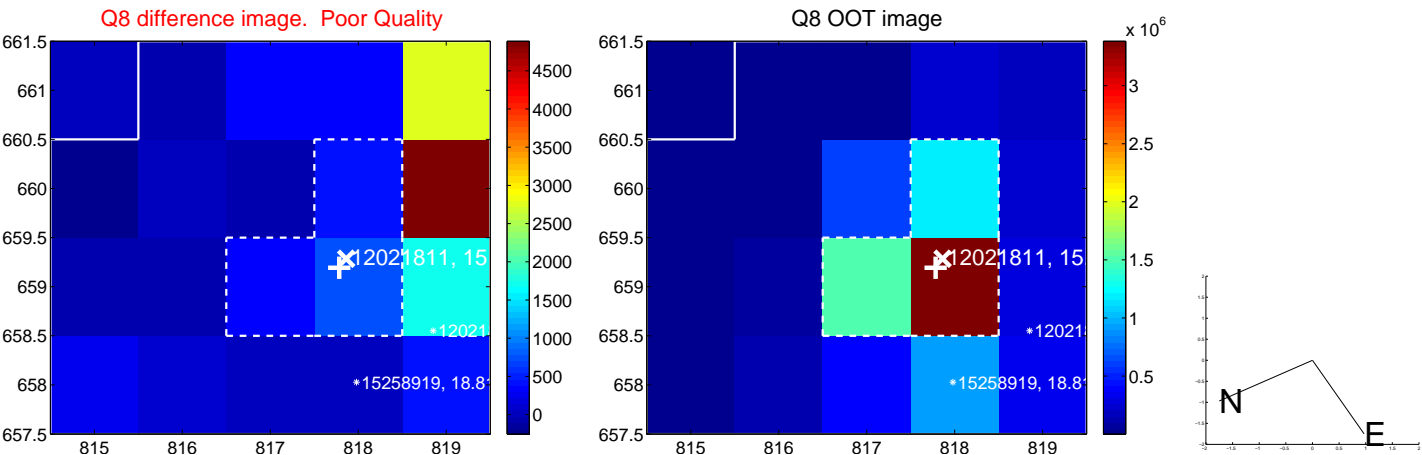
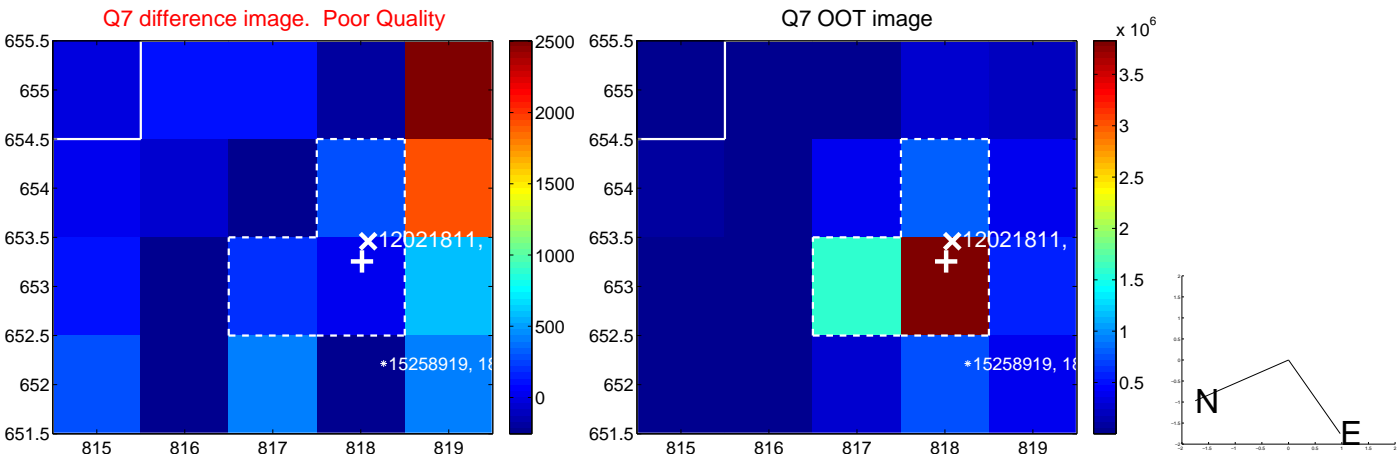
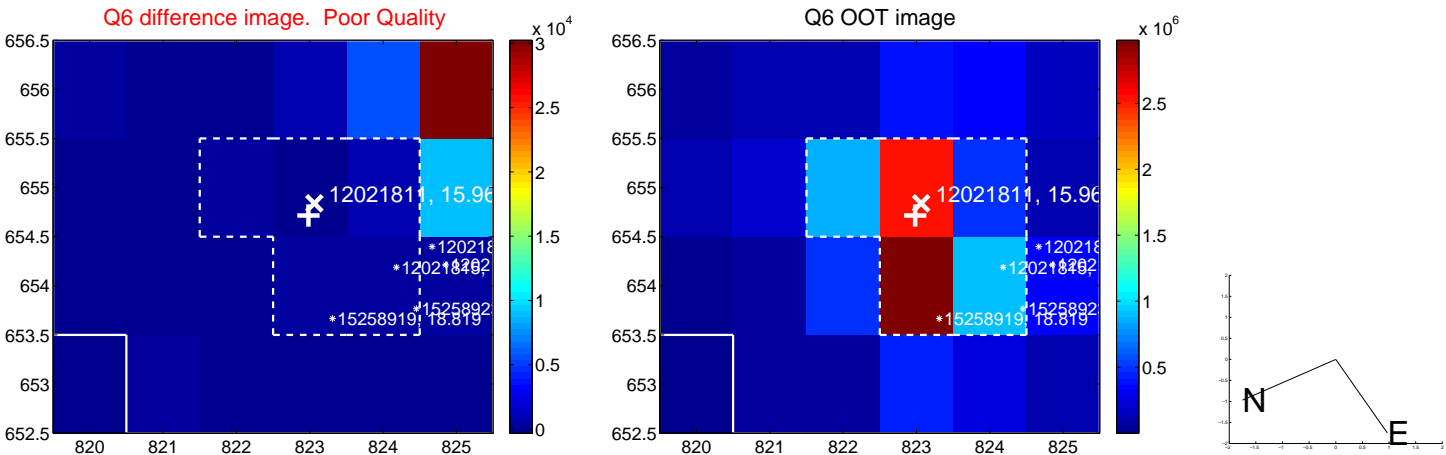
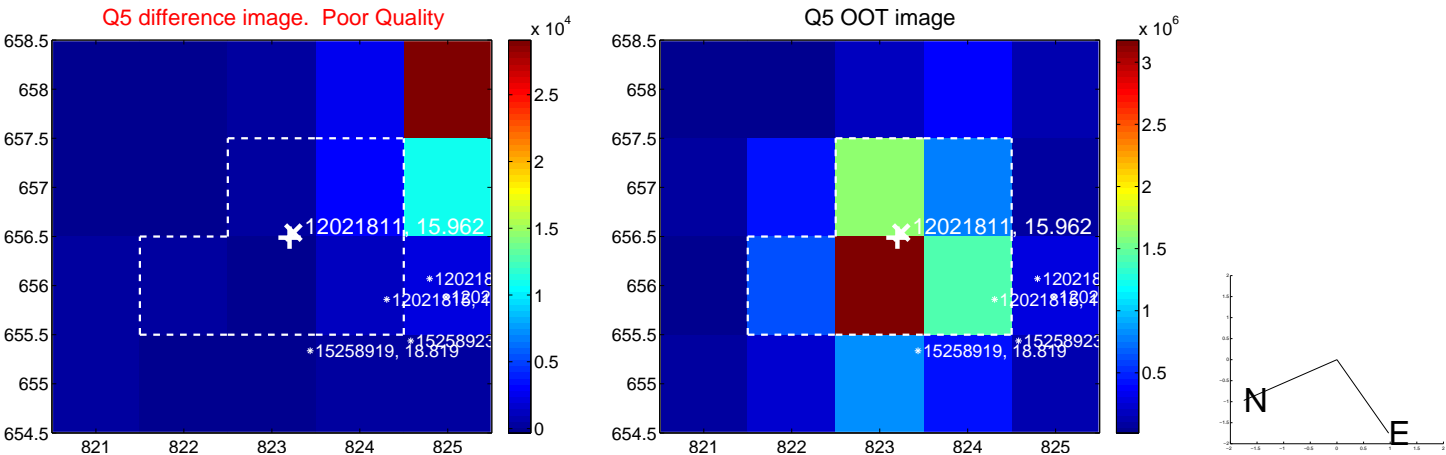
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

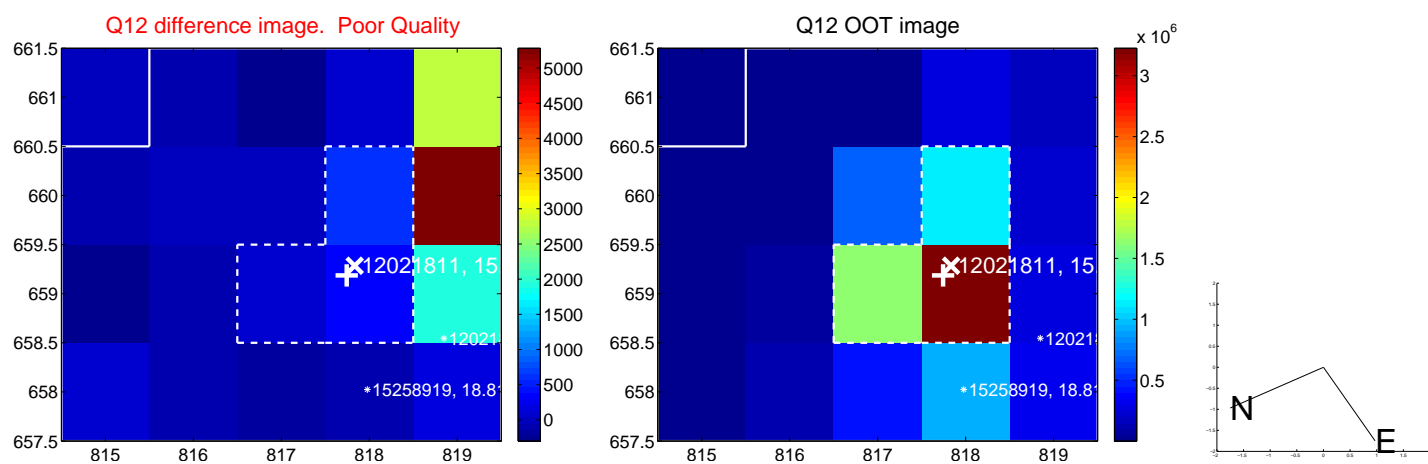
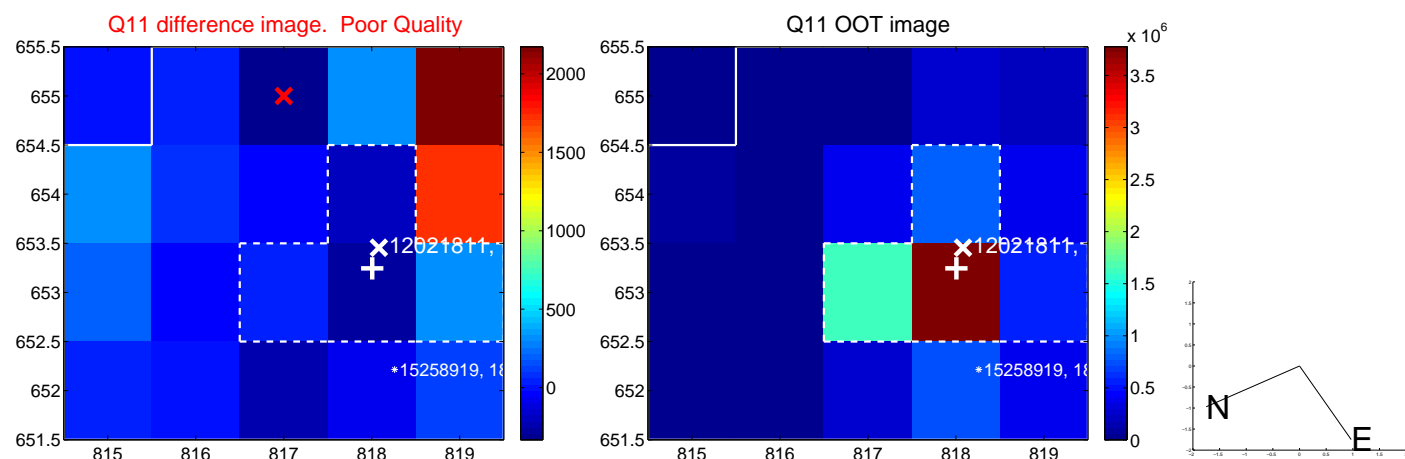
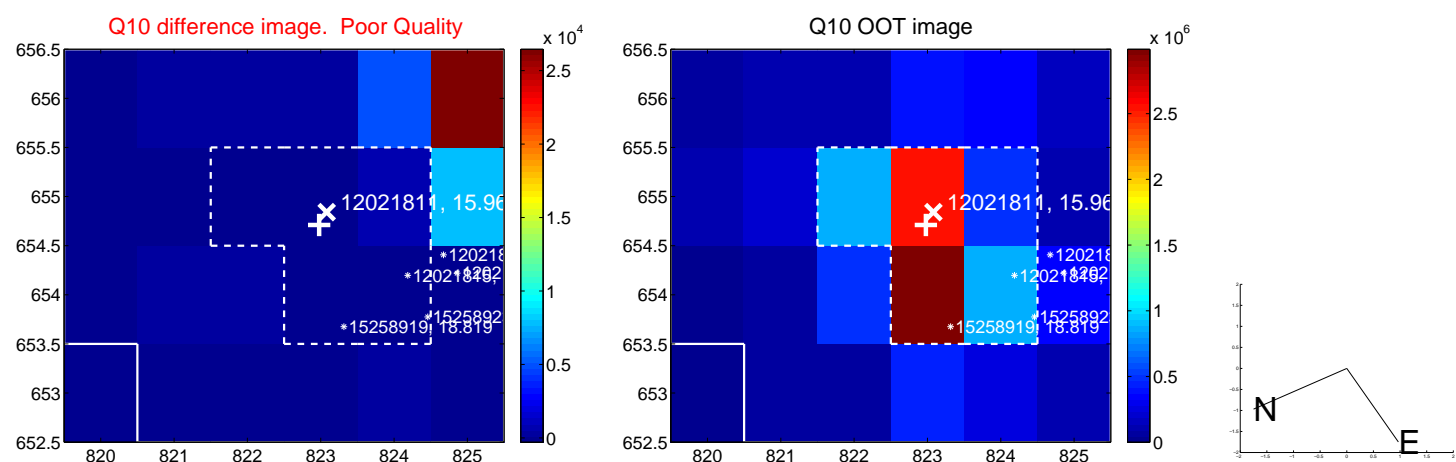
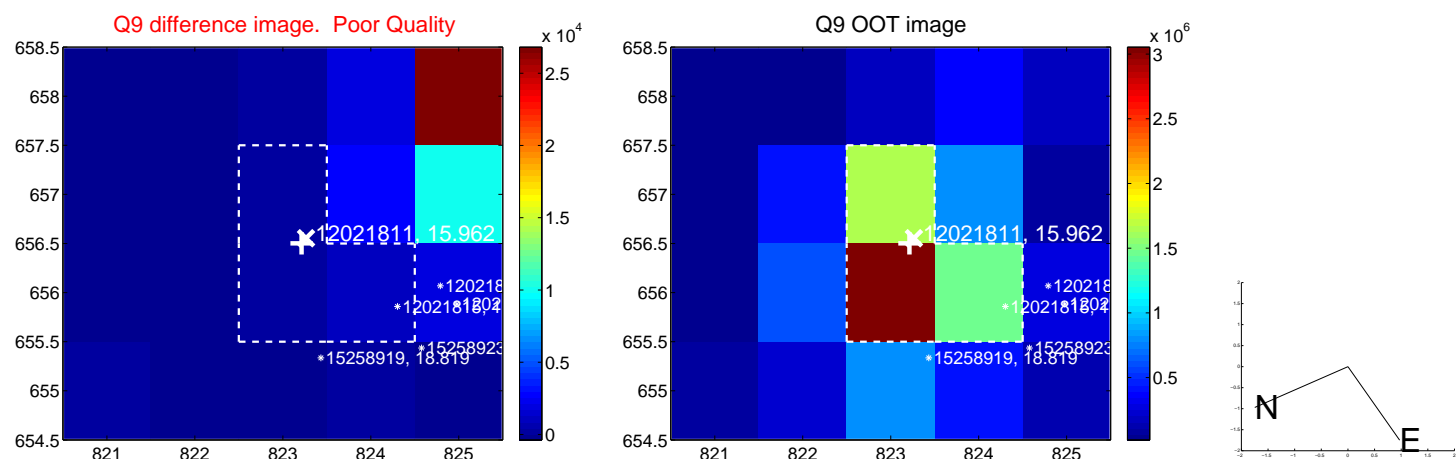




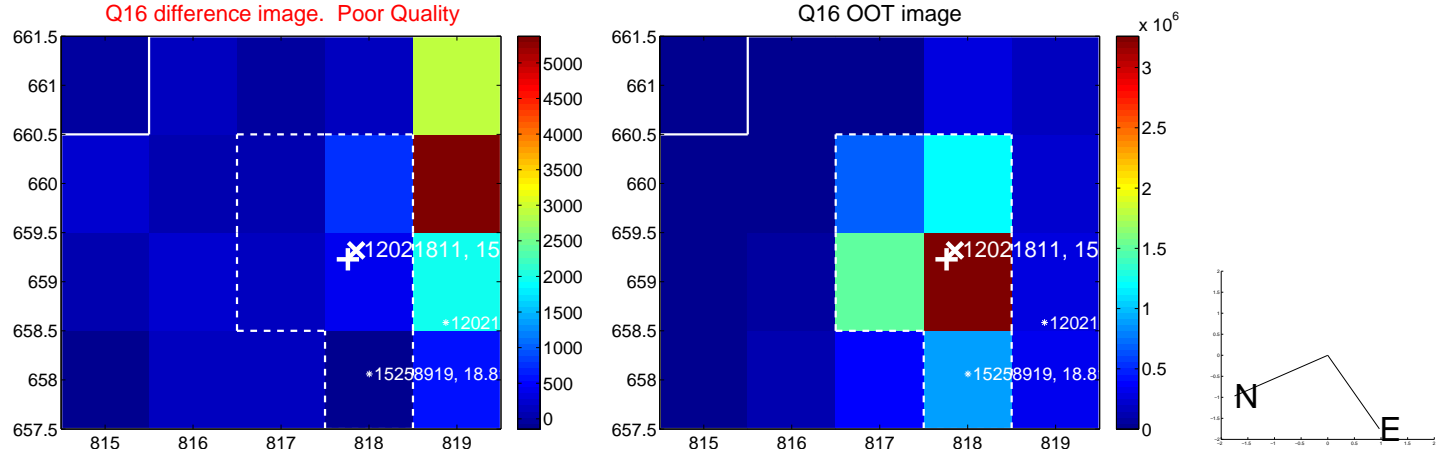
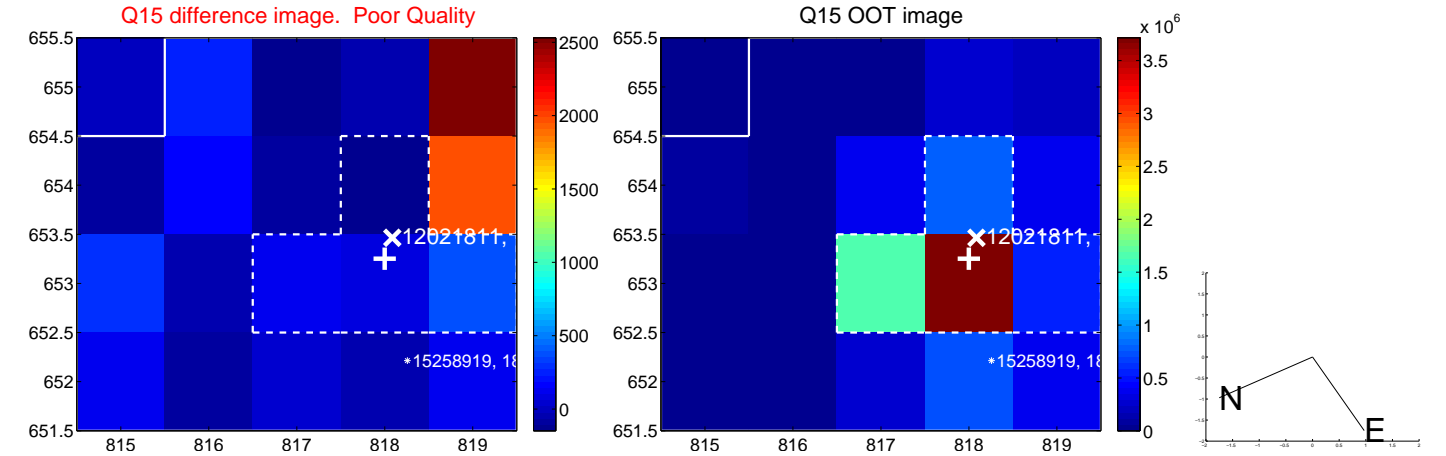
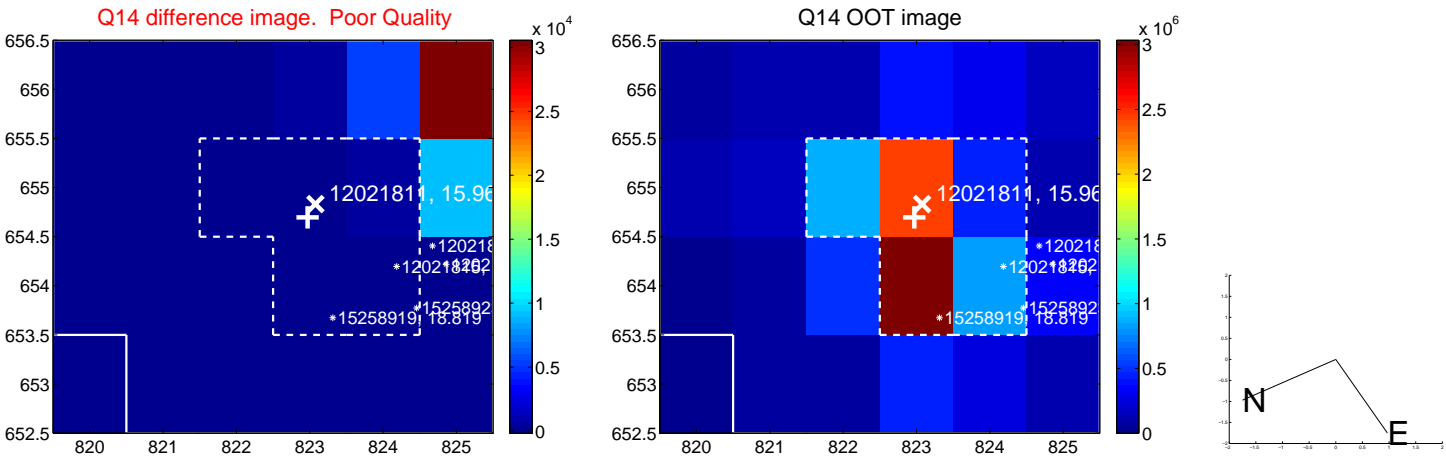
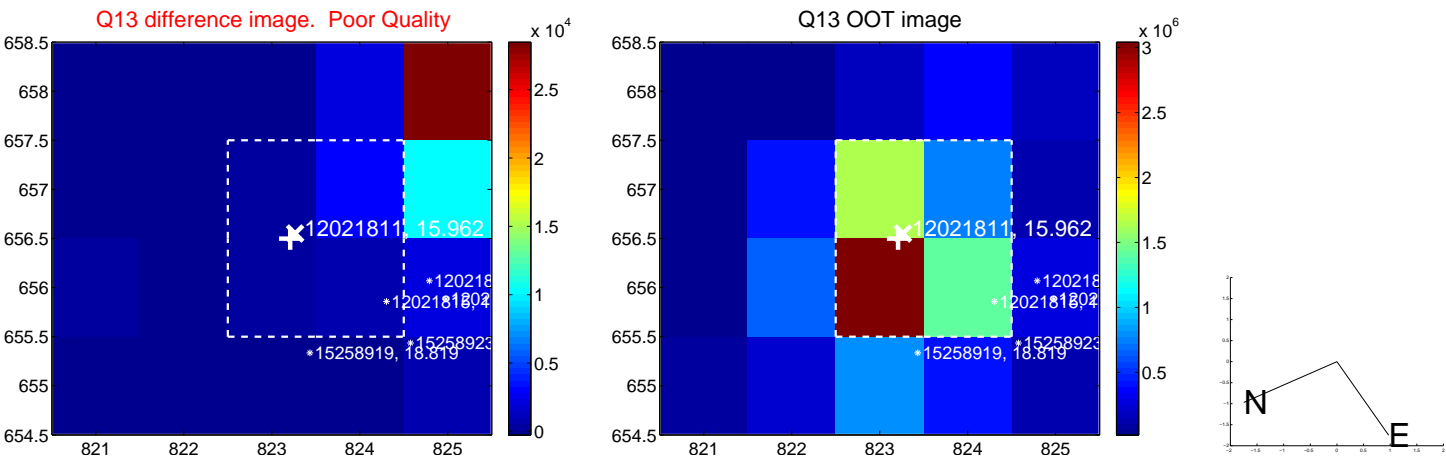
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



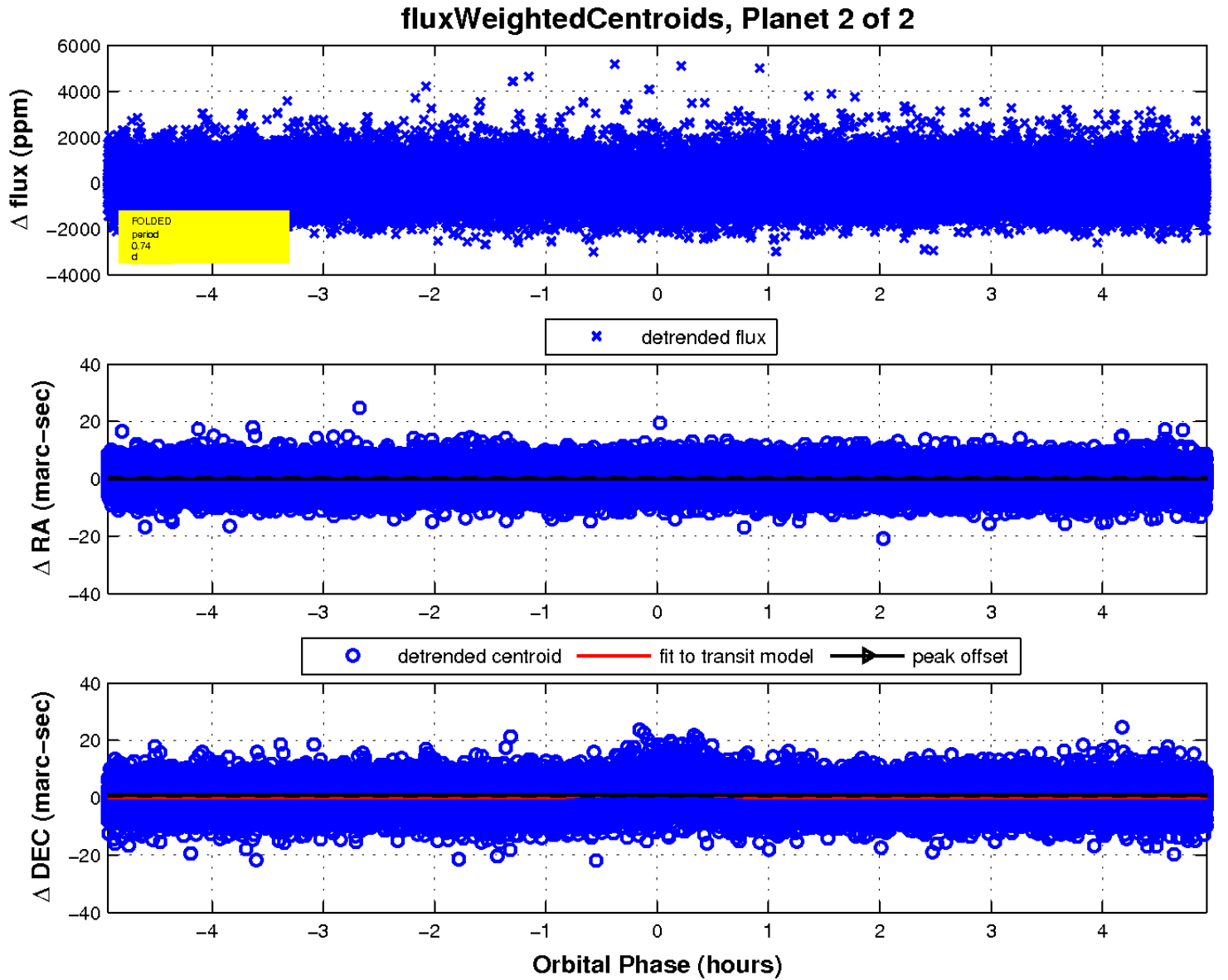
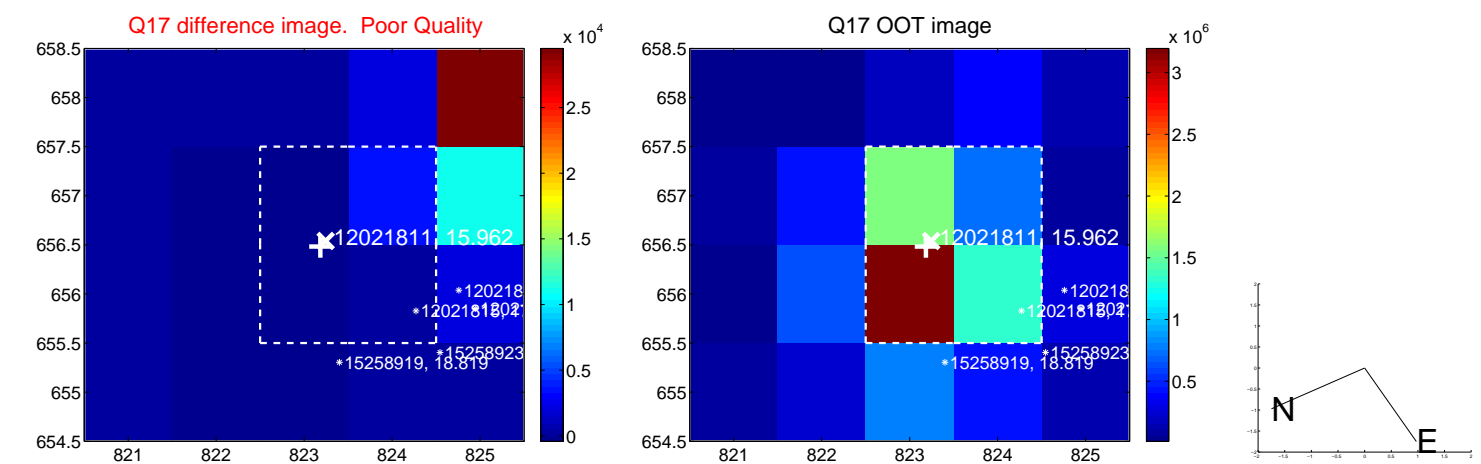
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination

